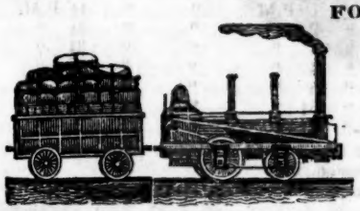
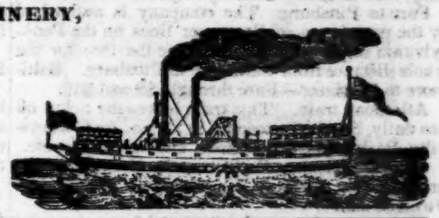
AMERICAN RAILROAD JOURNAL,

AND GENERAL ADVERTISER

FOR RAILROADS, CANALS, STEAMBOATS, MACHINERY, AND MINES.



ESTABLISHED 1831.



PUBLISHED WEEKLY, AT No. 23 CHAMBERS STREET, NEW YORK, AT FIVE DOLLARS PER ANNUM.

SECOND QUARTO SERIES, VOL. II., No. 22 | SATURDAY, MAY 30, 1846. | WHOLE No. 518, VOL. XIX.

BOSTON AND PROVIDENCE RAILROAD. Passenger Notice. Summer Arrangement. On and after Monday, April 6, 1846, the Passenger Trains will run as follows:

For New York—Night Line, via Stonington. Leaves Boston every day, but Sunday, at 5 p.m.

Accommodation Trains, leave Boston at 7½ a.m. and 4 p.m., and Providence at 8 a.m. and 4½ p.m.

Dedham trains, leave Boston at 8 a.m. 12½ m., 3½ p.m., and 6½ p.m. Leave Dedham at 7 a.m. and 9½ a.m. and 2½ and 5½ p.m.

Stoughton trains, leave Boston at 11½ a.m. and 5½ p.m. Leave Stoughton at 7·20 a.m. and 3½ p.m.

All baggage at the risk of the owners thereof.

31 1y W. RAYMOND LEE, *Sup't.*

BRANCH RAILROAD and STAGES Connecting with the Boston and Providence Railroad.

Stages connect with the Accommodation trains at the Foxboro' Station, to and from Woonsocket. At the Seekonk Station, to and from Lonsdale, R. I. via Pawtucket. At the Sharon Station, to and from Walpole, Mass. And at Dedham Village Station, to and from Medford, via Medway, Mass. At Providence, to and from Bristol, via Warren, R. I.—Taunton, New Bedford and Fall River cars run in connection with the accommodation trains.

NORWICH AND WORCESTER RAILROAD. Summer Arrangement, commencing Monday, April 6, 1846.

Accommodation Trains, daily, except Sunday. Leave Norwich, at 6 a.m., and 4½ p.m. Leave Worcester, at 10 a.m., and 4½ p.m.

☞ The morning Accommodation Trains from Norwich, and from Worcester, connect with the trains of the Boston, and Worcester and Western railroads each way.

The Evening Accommodation Train from Worcester connects with the 1½ p.m. train from Boston.

New York Train via Long Island Railroad:

Leave Allyn's Point for Boston, about 1 p.m., daily, except Sunday.

Leave Worcester for New York, about 10 a.m., stopping at Webster, Danielsonville, and Norwich.

New York Train via Steamboat—Leave Norwich for Boston, every morning, except Monday, on the arrival of the stamboat from New York, stopping at Norwich and Danielsonville.

Leave Worcester for New York, upon the arrival of the train from Boston, at about 4½ p.m., daily, except Sunday, stopping at Webster, Danielsonville and Norwich.

Freight Trains daily each way, except Sunday.—Special contracts will be made for cargoes, or large quanties of freight, on application to the superintendent.

☞ *Fares are Less when paid for Tickets than when paid in the Cars.* ☜

32 1y J. W. STOWELL, Sup't.

BOSTON AND MAINE RAILROAD. Upper Route, Boston to Portland via, Reading, Andover, Haverhill, Exeter, Dover, Great Falls, South & North Berwick, Wells, Kennebunk and Saco.

Summer Arrangement, 1846.

On and after April 13, 1846, Passenger Trains will leave daily, (Sundays excepted,) as follows:

Boston for Portland at 7½ a.m. and 2½ p.m.

Boston for Great Falls at 7½ a.m., 2½ and 4½ p.m.

Boston for Haverhill at 7½ and 11½ a.m., 2½, 4½ and 6 p.m.

Boston for Reading at 7½, 9, and 11½ a.m., 2½, 4½, 6 and 8 p.m.

Portland for Boston at 7½ a.m., and 3 p.m.

Great Falls for Boston at 6½ and 9½ a.m., and 4½ p.m.

Haverhill for Boston at 6½, 8½, and 11 a.m., and 4 and 6½ p.m.

Reading for Boston at 6½, 7½ and 9½ a.m., 12 m., 1½, 5 and 7½ p.m.

The Depot in Boston is on Haymarket Square.

Passengers are not allowed to carry Baggage above **$50** in value, and that *personal* Baggage, unless notice is given, and an extra amount paid, at the rate of the price of a Ticket for every **$500** additional value. CHAS. MINOT, *Sup't.*

GEORGIA RAILROAD. FROM AUGUSTA to ATLANTA—171 MILES. AND WESTERN AND ATLANTIC RAILROAD FROM ATLANTA TO OOTHCALOGA, 80 MILES.

This Road in connection with the South Carolina Railroad and Western and Atlantic Railroad now forms a continuous line, 388 miles in length, from Charleston to Oothcaloga on the Oostenanla River, in Cass Co., Georgia.

Rates of Freight, and Passage from Augusta to Oothcaloga.

On Boxes of Hats, Bonnets, and Furniture per foot.....16 cts.
" Dry goods, shoes, saddlery, drugs, etc., per 100 lbs.....95 "
" Sugar, coffee, iron, hardware, etc.....65 "
" Flour, bacon, mill machinery, grindstones, etc.....33½ "
" Molasses, per hogshead $9·50; salt per bus.20 "
" Ploughs and cornshellers, each.....75 "

Passengers $10·50; children under 12 years of age half price.

Passengers to Atlanta, head of Ga. Railroad, $7.

German or other emigrants, in lots of 20 or more, will be carried over the above roads at 2 cents per mile.

Goods consigned to S. C. Railroad Co. will be forwarded free of commissions. Freight may be paid at Augusta, Atlanta, or Oothcaloga.

J. EDGAR THOMSON,
Ch. Eng. and Gen. Agent.

Augusta, Oct. 21 1845. *44 1y

SUMMER ARRANGEMENT.—NEW YORK AND ERIE RAILROAD LINE, from April 1st until further notice, will run daily (Sundays excepted) between the city of New York and Middletown, Goshen, and intermediate places, as follows:

FOR PASSENGERS—

Leave New York at 7 A.M. and 4 P.M.
" Middletown at 6½ A.M. and 5½ P.M.

FARE REDUCED to $1 25 to Middletown—way in proportion. Breakfast, supper and berths can be had on the steamboat.

FOR FREIGHT—

Leave New York at 5 P.M.
" Middletown at 12 M.

The names of the consignee and of the station where to be left, must be distinctly marked upon each article shipped. Freight not received after 5 P.M. in New York.

Apply to J. F. Clarkson, agent, at office corner of Duane and West sts.

H. C. SEYMOUR, Sup't.

March 25th, 1846.

Stages run daily from Middletown, on the arrival of the afternoon train, to Milford, Carbondale, Honesdale, Montrose, Towanda, Owego, and West; also to Monticello, Windsor, Binghamton, Ithaca, etc., etc. Agent on board. 13 tf

BALTIMORE AND OHIO RAILROAD. MAIN STEM. The Train carrying the Great Western Mail leaves Baltimore every morning at 7½ and Cumberland at 8 o'clock, passing Ellicott's Mills, Frederick, Harpers Ferry, Martinsburgh and Hancock, connecting daily each way with—the Washington Trains at the Relay House seven miles from Baltimore, with the Winchester Trains at Harpers Ferry — with the various railroad and steamboat lines between Baltimore and Philadelphia and with the lines of Post Coaches between Cumberland and Wheeling and the fine Steamboats on the Monongahela Slack Water between Brownsville and Pittsburgh. Time of arrival at both Cumberland and Baltimore 5½ P. M. Fare between those points $7, and 4 cents per mile for less distances. Fare through to Wheeling $11 and time about 36 hours, to Pittsburgh $10, and time about 32 hours. Through tickets from Philadelphia to Wheeling $13, to Pittsburgh $12. Extra train daily except Sundays from Baltimore to Frederick at 4 P. M., and from Frederick to Baltimore at 8 A. M.

WASHINGTON BRANCH.

Daily trains at 9 A. M. and 5 P. M. and 12 at night from Baltimore and at 6 A. M. and 5½ P. M. from Washington, connecting daily with the lines North, South and West, at Baltimore, Washington and the Relay house. Fare $1 60 through between Baltimore and Washington, in either direction, 4 cents per mile for intermediate distances. s13y1

BALTIMORE AND SUSQUEHANNA Railroad. The Passenger train runs daily except Sunday, as follows:

Leaves Baltimore at 9 a.m., and arrives at 6¼ p.m. Arrives at York at 12¼ p.m., and leaves for Columbia at 1¼ p.m. Leaves Columbia at 2 p.m., and leaves York for Baltimore at 3 p.m. Fare to York $2. Wrightsville $2 50, and Columbia $2 62½. The train connects at York with stages for Harrisburg, Gettysburg, Chambersburg, Pittsburg and York Springs.

Fare to Pittsburg. The company is authorized by the proprietors of Passenger lines on the Pennsylvania improvements, to receive the fare for the whole distance from Baltimore to Pittsburg. Baltimore to Pittsburg.—Fare through, $9 and $10.

Afternoon train. This train leaves the ticket office daily, Sundays excepted, at 3½ p.m. for Cockeysville, Parkton, Green Springs, Owings' Mills, etc.

Returning, leaves Parkton at 6 and Cockeysville and Owings' Mills at 7, arriving in Baltimore at 9 o'clock a.m.

Tickets for the round trip to and from any point can be procured from the agents at the ticket offices or from the conductors in the cars. The fare when tickets are thus procured, will be 25 per cent. less, and the tickets will be good for the same and following day any passenger train.

D. C. H. BORDLEY, *Sup't.*
31 1y Ticket Office, 63 North st.

CENTRAL RAILROAD-FROM SAVANNAH to Macon. Distance 190 miles.

This Road is open for the transportation of Passengers and Freight. Rates of Passage, $8 00. Freight—

On weight goods generally...	50 cts. per hundred.
On measurement goods	13 cts. per cubic ft.
On brls. wet (except molasses and oil).....	$1 50 per barrel.
On brls. dry (except lime)...	80 cts. per barrel.
On iron in pigs or bars, castings for mills, and unboxed machinery.....	40 cts. per hundred.
On hhds. and pipes of liquor, not over 120 gallons.....	$5 00 per hhd.
On molasses and oil.....	$6 00 per hhd.

Goods addressed to F. WINTER, Agent, forwarded free of commission. THOMAS PURSE,
40 Gen'l. Sup't. Transportation.

NEW YORK & HARLEM RAILROAD CO.—Summer Arrangement.

On and after Friday, May 1st, 1846, the cars will run as follows:

Leave City Hall for Yorkville, Harlem and Morrianna, at 7, 8, 9, 10 and 11 a. m., and at 1, 2, 3 30, 4 30, 5, 6, and 6 30 p. m.

Leave City Hall for Fordham and Williams' Bridge, at 7, 10 and 11 a. m., and at 2, 3 30, 5, and 6 30 p. m.

Leave City Hall for Hunt's Bridge, Bronx, Tuckahoe, Hart's Corners and White Plains, at 7 and 10 a. m., and at 2 and 5 p. m.

Leave Harlem and Yorkville, at 7 10, 8 10, 9, 10, 11 10 a. m., and at 12 40, 2, 3 10, 5 10, 5 30, 6 10, and 7 p. m.

Leave Williams' Bridge and Fordham, at 6 45, 7 45, and 10 45 a. m., and at 12 15, 2 45, 4 45, and 5 45 p. m.

Leave White Plains, at 7 and 10 a. m., and at 2 and 5 p. m.

The freight train will leave the City Hall at 1 o'clock, p. m., and leave White Plains at 1 o'clock in the morning.

On Sundays, the White Plains train will leave the City Hall at 7 a. m. and 5 30 p. m.; will leave White Plains at 7 a. m. and 6 p. m.

On Sundays, the Harlem and Williams' Bridge trains will be regulated according to the state of the weather. 18

RAILROAD IRON.—THE "MONTOUR Iron Company," Danville, Pa., is prepared to execute orders for the heavy Rail Bars of any pattern now in use, in this country or in Europe, and equal in every respect in point of quality. Apply to MURDOCK, LEAVITT & CO., *Agents.*
Corner of Cedar and Greenwich Sts. 48 1y

LITTLE MIAMI RAILROAD.—1846.— Summer Arrangement.

Two passenger trains daily.

On and after Tuesday, May 5th, until further notice, two passenger trains will be run—leaving Cincinnati daily (Sundays excepted) at 9 a. m. and 1½ p. m. Returning, will leave Xenia at 5 o'clock 50 min. a. m., and 2 o'clock 40 min. p.m.

On Sundays, but one train will be run—leaving Cincinnati at 9, and Xenia at 5 50 min. a. m.

Both trains connect with Neil, Moore & Co.'s daily line of stages to Columbus, Zanesville, Wheeling, Cleveland, Sandusky City and Springfield.

Tickets may be procured at the depot on East Front street.

The company will not be responsible for baggage beyond fifty dollars in value, unless the same is returned to the conductor or agent, and freight paid at the rate of a passage for every $500 in value above that amount. W. H. CLEMENT,
19 Superintendent.

CALIGRAPHIC BLACK LEAD PENcil, Manufactured by E. Wolff and Son, 23 Church Street, Spitalfields, London.

The Caligraphic Pencils have been invented by E. Wolff and Son, after the expenditure of much time and labor. They are the result of many experments; and every effort that ingenuity and experience could suggest, has been made to insure the highest degree of excellence, and the profession may rely upon their being all that can be desired.

They are perfectly free from grit; and for richness of tone, depth of color, delicacy of tint, and evenness of texture, they are not to be equalled by the best Cumberland Lead that can be obtained at the present time, and are infinitely superior to every other description of Pencil now in use.

The Caligraphic Pencils will also recommend themselves to all who use the Black Lead Pencils as an instrument of professional importance or recreation, by their being little more than half the price of other pencils.

An allowance will be made on every groce purchased by Artists or Teachers.

May be had of all Artists, Colourmen, Stationers, Booksellers, etc.

A single pencil will be forwarded as a sample, upon the receipt of postage stamps to the amount.

Caution.—To prevent imposition, a highly finished and embossed protection wrapper, difficult of imitation, is put around each dozen of Pencils. Each Pencil will be stamped on both sides, "Caligraphic Black Lead, E. Wolff and Son, London."

The subscriber has on hand a full supply of Wolff and Sons celebrated Creta Loevis, or Colored Drawing Chalks, also their pure Cumberland Lead and extra prepared Lead Pencils, and Mathematical Lead Pencils.

P. A. MESIER,
Stationer and Sole Agent,
No. 49 Wall Street.

N. B.—A complete assortment of Steven's *Genuine* Inks, Fluids, Imitating Wood stains, and Graining Colours at the Manufacturers prices.

KEARNEY FIRE BRICK. F. W. BRINLEY, Manufacturer, Perth Amboy, N. J. Guaranteed equal to any, either domestic or foreign. Any shape or size made to order. Terms, 4 mos. from delivery of brick on board. Refer to

James P. Allaire,
Peter Cooper,
Murdock, Leavirt & Co. } New York.
J. Triplett & Son, Richmond, Va.
J. R. Anderson, Tredegar Iron Works, Richmond, Va.
J. Patton, Jr.
Colwell & Co. } Philadelphia, Pa.
J. M. L. & W. H. Scovill, Waterbury, Con.
N. E. Screw Co.
Eagle Screw Co. } Provicence, R. I.
William Parker, Supt. Bost. and Worc. R. R.
New Jersey Malleable Iron Co., Newark, N. J.
Gardiner, Harrison & Co. Newark, N. J.

25,000 to 30,000 made weekly. 35 1y

FLAT BAR, ENGLISH ROLLED, RAILroad Iron, 2½ ⋈ ½—a large part suitable to relay. For sale by C. J. F. BINNEY,
Commission Merchant, 1 City Wharf,
11 1m Boston, Mass

TROY AND GREENBUSH RAILROAD. Spring Arrangement. Trains will be run on this Road as follows, until further notice, Sundays excepted.

Leave Troy at	6½	A.M.	Leave Albany at	7	A.M.
" "	7½	"	" "	8	"
" "	8½	"	" "	9	"
" "	9½	"	" "	10	"
" "	10½	"	" "	11	"
" "	11½	"	" "	12	M.
" "	1	P.M.	" "	1½	P.M.
" "	2	"	" "	2½	"
" "	3	"	" "	3½	"
" "	4	"	" "	4½	"
" "	5	"	" "	5½	"
" "	5½	"	" "	6	"
" "	6½	"	" "	7	"

☞ The 6½ a.m. and 2 o'clock p.m. runs from Troy, to Boston runs.

The 12 m. and 6 o'clock p.m. trains from Boston runs.

☞ Passengers from Albany will leave in the Boston Ferry Boat at the foot of Maiden Lane, which starts promptly at the time above advertised.

Passengers will be taken and left at the principal Hotels in River Street, in Troy, and at the Nail Works and Bath Ferry.

L. R. SARGENT,
Superintendent.
Troy, April 1st, 1846. 14 1y

MACHINE WORKS OF ROGERS, Ketchum & Grosvenor, Patterson, N. J. The undersigned receive orders for the following articles, manufactured by them of the most superior description in every particular. Their works beingextensive and the number of hands employed beinglarge, they are enabled to execute both large and small orders with promptness and despatch.

Railroad Work.

Locomotive steam engines and tenders; Driving and other locomotive wheels, axles, springs & flange tires; car wheels of cast iron, from a variety of patterns, and chills; car wheels of cast iron with wrought tires; axles of best American refined iron; springs; boxes and bolts for cars.

Cotton, Wool and Flax Machinery

of all descriptions and of the most improved patterns, style and workmanship.

Mill gearing and Millwright work generally hydraulic and other presses; press screws; calleiders; lathes and tools of all kinds; iron and brass castings of all descriptions.

ROGERS, KETCHUM & GROSVENOR,
a45 Paterson, N. J., or 60 Wall street, N. York.

TO RAILROAD COMPANIES AND MANufacturers of railroad Machinery. The subscribers have for sale Am. and English bar iron, of all sizes; English blister, cast, shear and spring steel; Juniata rods; car axles, made of double refined iron; sheet and boiler iron, cut to pattern; tiers for locomotive engines, and other railroad carriage wheels, made from common and double refined B. O. iron; the latter a very superior article. The tires are made by Messrs. Baldwin & Whitney, locomotive engine manufacturers of this city. Orders addressed to them, or to us, will be promptly executed.

When the exact diameter of the wheel is stated in the order, a fit to those wheels is guaranteed, saving to the purchaser the expense of turning them out inside. THOMAS & EDMUND GEORGE,
ja45 N. E. cor. 12th and Market sts., Philad., Pa.

THE SUBSCRIBERS, AGENTS FOR the sale of

Codorus,
Glendon,
Spring Mill and
Valley, } Pig Iron.

Have now a supply, and respectfully solicit the patronage of persons engaged in the making of Machinery, for which purpose the above makes of Pig Iron are particularly adapted.

They are also sole Agents for Watson's celebrated Fire Bricks and prepared Kaolin or Fire Clay, orders for which are promptly supplied.

SAM'L. KIMBER, & CO.,
59 North Wharves,
Jan. 14, 1846. [1y4] *Philadelphia, Pa.*

RAILROAD IRON AND LOCOMOTIVE Tyres imported to order and constantly on hand by A. & G. RALSTON
Mar. 20tf 4 South Front St., Philadelphia.

THE NEWCASTLE MANUFACTURING Company continue to furnish at the Works, situated in the town of Newcastle, Del., Locomotive and other steam engines, Jack screws, Wrought iron work and Brass and Iron castings, of all kinds connected with Steamboats, Railroads, etc.; Mill Gearing of every description; Cast wheels (chilled) of any pattern and size, with Axles fitted, also with wrought tires, Springs, Boxes and bolts for Cars; Driving and other wheels for Locomotives.

The works being on an extensive scale, all orders will be executed with promptness and despatch. Communications addressed to Mr. William H. Dobbs, Superintendent, will meet with immediate attention. ANDREW C. GRAY,
a45 President of the Newcastle Manuf. Co.

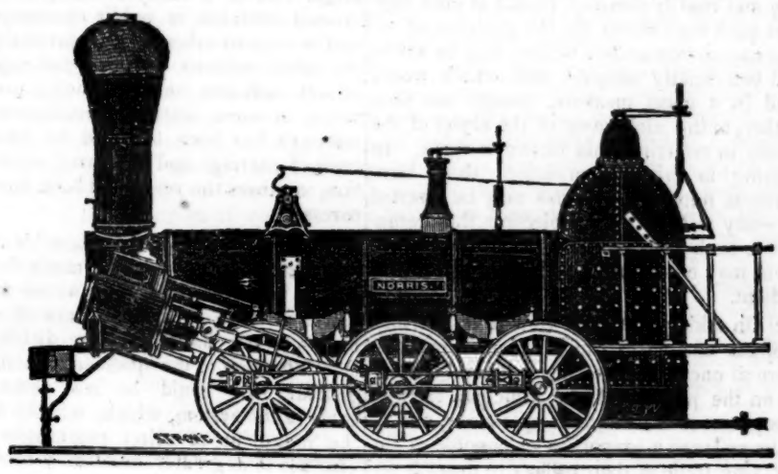
CUSHMAN'S COMPOUND IRON RAILS etc. The Subscriber having made important improvements in the construction of rails, mode of guarding against accidents from insecure joints, etc.—respectfully offers to dispose of Company, State Rights, etc., under the privileges of *letters patent* to Railroad Companies, Iron Founders, and others interested in the works to which the same relate. Companies reconstructing their tracks now have an opportunity of *improving* their roads on terms very advantageous to the varied interests connected with their construction and operation; roads having in use flat bar rails are particularly interested, as such are permanently available by the plan.

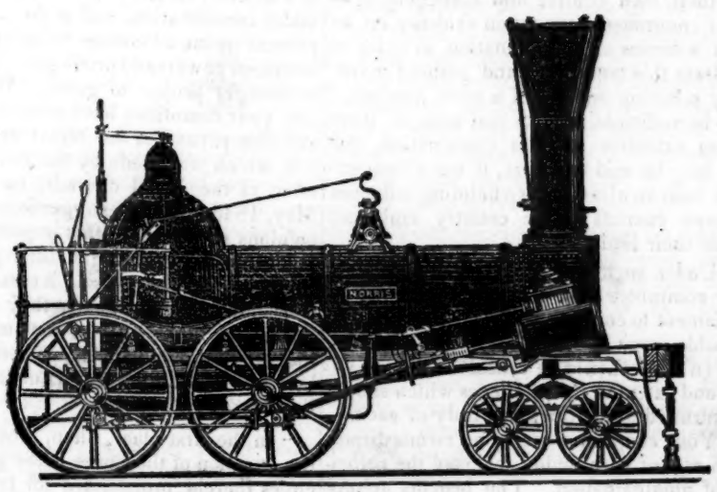
W. Mc. C. CUSHMAN, *Civil Engineer*,
Albany, N. Y.

Mr. C. also announces that Railroads, and other works pertaining to the profession, may be constructed under his advice or personal supervision. Applicaitons must be post paid.

NORRIS' LOCOMOTIVE WORKS.

BUSH HILL, PHILADELPHIA, Pennsylvania.





MANUFACTURE their Patent 6 Wheel Combined and 8 Wheel Locomotives of the following descriptions, viz:

Class	1,	15	inches	Diameter of	Cylinder,	× 20	inches	Stroke.
"	2,	14	"	"	"	× 24	"	"
"	3,	14½	"	"	"	× 20	"	"
"	4,	12½		"	"	× 20	"	"
"	5,	11½		"	"	× 20	"	"
"	6,	10½		"	"	× 18	"	"

With Wheels of any dimensions, with their Patent Arrangement for Variable Expansion.

Castings of all kinds made to order: and they call attention to their Chilled Wheels or the Trucks of Locomotives, Tenders and Cars.

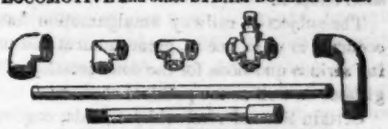
NORRIS, BROTHERS.

TO RAILROAD COMPANIES AND BUILDERS OF MARINE AND LOCOMOTIVE ENGINES AND BOILERS.

PASCAL IRON WORKS.

WELDED WROUGHT IRON TUBES

From 4 inches to ¼ in calibre and 2 to 12 feet long, capable of sustaining pressure from 400 to 2500 lbs. per square inch, with Stop Cocks, T's, L's, and other fixtures to suit, fitting together, with screw joints, suitable for STEAM, WATER, GAS, and for LOCOMOTIVE and other STEAM BOILER Flues.



Manufactured and for sale by
MORRIS, TASKER & MORRIS,
Warehouse S. E. Corner of Third & Walnut Streets,
PHILADELPHIA.

GREAT SOUTHERN MAIL LINE! VIA Washington city, Richmond, Petersburg, Weldon and Charleston, S. C., direct to New Orleans. The only Line which carries the Great Southern Mail, and Twenty-four Hours in advance of Bay Line, leaving Baltimore same day.

Passengers leaving New York at 4½ P.M., Philadelphia at 10 P.M., and Baltimore at 6½ A.M., proceed without delay at any point, by this line, reaching Richmond in *eleven*, Petersburg in *thirteen and a half hours*, and Charleston, S. C., in *two days* from Baltimore.

Fare from Baltimore to Charleston.....$21 00
" " " Richmond..... 6 60

For Tickets, or further information, apply at the *Southern Ticket Office*, adjoining the *Washington Railroad Office*, Pratt street, Baltimore, to
STOCTON & FALLS, Agents.

GEORGE VAIL & CO., SPEEDWELL IRON Works, Morristown, Morris Co., N. J.—Manufacturers of Railroad Machinery; Wrought Iron Tires, made from the best iron, either hammered or rolled, from 1½ in. to 2½ in thick.—bored and turned outside if required. Railroad Companies wishing to order, will please give the exact inside diameter, or circumference, to which they wish the Tires made, and they may rely upon being served according to order, and also punctually, as a large quantity of the straight bar is kept constantly on hand.—Crank Axles, made from the best refined iron; Straight Axles, for Outside Connection Engines; Wro't. Iron Engine and Truck Frames; Railroad Jack Screws; Railroad Pumping and Sawing Machines, to be driven by the Locomotive; Stationary Steam Engines; Wro't. Iron work for Steamboats, and Shafting of any size; Grist Mill, Saw Mill and Paper Mill Machinery; Mill Gearing and Mill Wright work of all kinds; Steam Saw Mills of simple and economical construction, and very effective Iron and Brass Castings of all descripions.
ja451y

NICOLL'S PATENT SAFETY SWITCH for Railroad Turnouts. This invention, for some time in successful operation on one of the principal railroads in the country, effectually prevents engines and their trains from running off the track at a switch, left wrong by accident or design.

It acts independently of the main track rails, being laid down, or removed, without cutting or displacing them.

It is never touched by passing trains, except when in use, preventing their running off the track. It is simple in its construction and operation, requiring only two Castings and two Rails; the latter, even if much worn or used, not objectionable.

Working Models of the Safety Switch may be seen at Messrs. Davenport and Bridges, Cambridgeport, Mass., and at the office of the Railroad Journal, New York.

Plans, Specifications, and all information obtained on application to the Subscriber, Inventor, and Patentee. G. A. NICOLLS,
ja45 *Reading, Pa.*

RAILROAD IRON WANTED. WANted, 50 tons of Light Flat Bar Railroad Iron. The advertisers would prefer second-hand iron, if not too much worn. Address Box 384 Philadelphia P. O.—Post paid. 84

Railway Amalgamation.

The term amalgamation, in modern times has been extended in meaning, first to the union of the black and white race, and now to the consolidation of interest of two or more railroads or canals. In this latter sense we believe the word was first used in England—and as at present much is said upon the subject, the use has become so general that we shall adopt it.

The subject of railway amalgamation has often occurred to us as one of great moment and presenting serious questions for the consideration of the legislator as well as the political economist.

Certain lines of road without doubt, can be managed to the greater profit of stockholders and to the greater accommodation of the public, by a union of interests—but in certain other cases, whatever may be the benefit to the former, there is certainly none to the latter.

Where then is the line of distinction to be drawn, and how far can laws prevent oppression and abuse of the public, for the benefit of a few, without interfering with arrangements productive of advantage to all parties?

The question is a nice one—the answer to it by a select committee of parliament and of the board of trade, seems so just, and at the same time throws so much light upon railway movements in England, that we copy the papers as we find them in the Railway Chronicle.

"*First Report from the Select Committee on the House of Commons on Railways and Canals Amalgamation.*

"Your committee, in discharging the duty imposed upon them, have in the first instance applied themselves to the task of ascertaining how many of the railway and canal bills now before parliament contain clauses involving the principle of amalgamation.

"Owing to the circumstance that several of them are still awaiting the preliminary investigation of the committee on standing orders, and have not yet been formally introduced into the house, and that the Irish railway bills have been commenced in the house of lords, it has been found difficult, if not impossible, to form a correct estimate of their number; but, making allowance for error, and exclusive of the Irish bills it may be stated that they amount to about 161 for England, and about 56 for Scotland. Of this number, 37 are bills for the amalgamation, by purchase, lease, or otherwise, of existing railway companies with each other, 32 of railways with canals; 155 for the formation of new lines, and their amalgamation with existing companies or with each other.—Among the last will be found bills containing clauses which give a general power of leasing the tolls, or leasing or selling the works or lines, with the view of effecting an amalgamation at some future time with any company or companies which may be disposed to take advantage of the power so given. Also bills which, containing clauses with a somewhat similar object, are however restricted to the option of two or more companies therein specified. In addition to and not included in the above list, there are several bills in which powers are taken by existing companies to contribute to the funds for the execution of the works of new lines; thereby securing, in proportion to the sum subscribed a permanent influence in the future management of the company. Looking to the number of these bills, and to the fact that a great proportion of them have been already grouped, and submitted by the house to select committees for the consideration of their merits, and that some of them are advanced even to another stage, your committee have felt bound to come to an early decision as to the course which it would recommend the house to pursue in respect to them.

"After the best deliberation which the time permitted, it has been thought on the whole most advisable, with a view to avoiding inconvenient obstruction to the business before committees, not to interfere more than is absolutely necessary with their present progress—and that your committee, taking advantage of such information as could be the most easily and readily obtained, should at once suggest such regulations for the guidance of select committees as they believe may be safely and beneficially adopted, and which would tend in a great measure, though not altogether, to the attainment of the object of the house in referring this matter to them. In coming to this determination, they have borne in mind that a clause may be inserted in every railway bill, subjecting the promoters to such additional enactments as parliament may on further consideration deem expedient.

"On taking a general view of the various projects of amalgamation, your committee were at once struck with the general tendency on the part of all the principal railway companies to extend their operations, and to unite as large a proportion as possible of the carrying trade of their respective districts under their own control and management.—Your committee have taken evidence on several schemes of amalgamation, in order to illustrate this tendency; and without invidiously selecting one out of a great number, it may be sufficient to state that some of them are so extensive in their combination, that they may be said to secure, if not a monopoly, at least an almost overwhelming influence in those districts of the country embraced within their limits.

"Under such circumstances it appears to your committee to be the imperative duty of parliament to consider well and carefully the probable result of these great combinations, and, (if they should be consented to,) the nature and extent of the privileges which should be entrusted to the directing body of each.

"Your committee are by no means disposed to regard with undue jealousy the principle of amalgamation. The benefits arising from it, if conducted within proper limits and under judicious regulations, are indisputable. It enables companies to conduct their operations with less expense to themselves, and consequently with diminished charges to the public; it conduces to better arrangements and more efficient control, and thereby to greater speed, and at the same time to increased safety to life and to property. It enables companies conjointly to provide that increase of accommodation for the public at their terminal stations, and in their general establishment, which many of them could not separately afford. It also enables small companies, whose lines are worked at great expense, to obtain the benefits of cheapness and general arrangement which are enjoyed by lines of greater extent. The above are advantages of no small importance, especially in the more populous districts of the country where the junction of numerous lines under different management, tends to expense, obstruction and confusion, and danger to life and property On the other hand, it is equally manifest that if carried beyond certain limits and especially if not subjected to proper regulation and control, amalgamation must necessarily have a directly opposite tendency in each and every respect. It might greatly diminish the inducements to a low rate of fares, or to the adoption of new improvements; it might tend to a laxity of discipline and decreased attention to public accommodation: and in various other ways injuriously affect the public interests. Indeed, past experience affords sufficient and convincing proof that while in some instances amalgamation of railways has been followed by diminished rates of carriage and increased accommodation, in others the result has been directly the reverse.

"It would not have been possible for your committee, without causing much delay and public inconvenience, to examine into the merits of these various schemes of amalgamation; they have therefore directed their chief attention to the question, whether any general rule could be laid down, applicable to the system, which, without fettering the judgment of select committees, migh conduce to a greater uniformity of decision to a stricter examination into the bills brought under consideration, and at the same time to prevent undue advantage being taken of any increased powers and privileges which it might be thought proper to grant. With this object, your committee have given an early and attentive perusal to the report upon this subject, which was made by the railway department of the board of trade, on the 7th of May, 1845. To the suggestions and to the opinions expressed in that report, your committee are disposed to give their general concurrence; and in pressing it earnestly on the consideration of members, they deem it necessary to make only a few additional remarks, most of which have been suggested by experience derived subsequently to its publication.

"In the first place, then, they beg to call the attention of the house to the general principles therein propounded for regulating its decisions on amalgamation bills; and with a view to carry out in detail some of those principles they recommend—

"That 'general powers of granting or accepting a lease or sale of a railway or canal, or of otherwise merging the independence of one company in another not named, should not be allowed to be inserted in any bill.'

"Secondly, that the same rule be applied to all bills which contain clauses enabling the companies to lease or sell their tolls or

works to any one of a number of railway companies therein specified.

"Thirdly, that a clause be inserted in each bill subjecting all the parties involved in it to all general railway acts.

"Fourthly, that in all instances in which railway companies propose to take powers of amalgamation, the rates and tolls of the amalgamated companies should be subjected to revision.

"At the present time, owing in some instances to a system of low fares being found most profitaale, in others to actual or threatened competition, the maximum rates or tolls hitherto imposed by parliament has not been generally required as a limitation. It is manifest, however, that if a system of amalgamation is to be extensively adopted, the latter inducement to low charges will be materially diminished, if not altogether done away with.

"It would be impossible to lay down any precise rule for the guidance of the house in this respect, which would not be subject to numerous exceptions; the decision, therefore, as to the exact limitation of fares must at present be left to the discretion of each committee, to be applied according to the merits of each separate case. It ought, however, always to be borne in mind that the effect of amalgamation is to diminish the expense of working and managing railways, and thereby to enable the proprietors to secure a greater profit on their existing traffic; and in this view of the case it might be taken as a general rule, subject to special exceptions, that the maximum of rates and tolls combined ought not to exceed the lowest rates which had been previously demanded and received by the respective companies. It will doubtlessly be found impossible to adhere rigidly to this rule in all cases. Circumstances peculiar to a particular railway may render it desirable that rather a wider limit should be allowed; but your committee are confident that in a far greater number of instances, especially in those of extensive combinations and of large companies, the limitation which they have suggested will be found to fall short of, rather than to exceed, that which might be justly imposed with a due regard to the interests of the shareholders on the one hand, and of the public on the other. Your committee, therefore, recommend that select committees appointed for the consideration of these bills should impose a new limitation of tolls and fares, and specially report any circumstance which may lead them to allow any increase in the rates previously received.

"There are several instances now before parliament of two or more companies applying for powers of amalgamation, whose respective rates and charges vary in amount.

"Your committee submit that it should be the duty of select committees, in these cases, to exercise much care in the adjustment and substitution of a maximum rate.

"Your committee would strongly urge upon the attention of the house the charges made for the conveyance of coals; their cheapness being of paramount importance to the manufacturing and commercial interests of this country. A glance at the proposed amalgamations in the neighborhood of the great coal and manufacturing districts, will at once suggest that if the present competition is to be diminished, on which alone the public have to rely as a security against high charges, it is absolutely necessary that a new limitation of rates should be imposed, at once equal to all parties, and as low as is consistent with justice.

"With a view to affording the house the fullest information as to the grounds on which committees have founded their decisions, it would be desirable that a schedule be appended to each report, giving under the various heads of traffic, the lowest amount of charges made by each company during the two preceding years, and the maximum of those which are allowed in the bill to the amalgamated companies.

"Having thus referred to the case of legislative amalgamations, your committee ought not to omit to notice that such important lines of railway originally formed by independent companies, and with respect to which no legislative amalgamation has yet been proposed, are at present practically under the same control and management; and so long as these parties feel it to be their interest to combine, all the evils to be apprehended from amalgamation may be produced by private arrangements between them. It is true that such arrangements cannot acquire a permanent character without the sanction of parliament; but on the other hand they enable the parties, by avoiding an application to parliament, temporarily to escape the necessity of submitting to those provisions which parliament may see fit to impose for the benefit of the public as the condition of amalgamation. Your committee have felt it their duty to advert to this point as one requiring serious consideration; although they are not yet prepared to make any definite suggestion for the purpose of averting any evils which might arise from an abuse of the powers derived from these private arrangements.

"Your committee trust that the rules which they have suggested may assist the select commitee on railway groups in their deliberations, and may contribute to the uniformity of their decisions.

"As regards the amalgamation of railways with canals, your committee have not been able as yet to obtain sufficient information to justify them in offering any definite suggestions; but they propose immediately after the recess to enter more fully into that important branch of the subject.

"April 8, 1846.

APPENDIX.

"*Extract from the Report of the Railway Department of the Board of Trade on Proposed Amalgamations of Railways; dated Railway Department, Board of Trade, Whitehall, May 7, 1845.*

"The present unsettled state of the railway system, when almost every day brings forward some proposals for a new railway, or some new combination among existing interests, renders it peculiarly undesirable that permanent amalgamations should be precipitately allowed, unless in cases where the advantage to the public is perfectly manifest. These observations apply principally to the case of amalgamations between railways which have been originally projected and sanctioned as independent undertakings. There is another class of cases where new lines are brought forward by the aid of, and in alliance with, existing companies, who subscribe a portion of the capital, and guarantee a certain return upon it, and take powers to lease or purchase the line when made. In such cases it is evident that greater latitude must be allowed, as otherwise the inducement to the existing company to support the new line would be in a great measure withdrawn, and in many cases the undertaking could not otherwise be supported. In such cases it would appear to be fair to allow an existing company promoting a line sanctioned as an useful undertaking, in exchange for a guarantee on their part to complete what they undertake, to purchase or amalgamate with themselves such small lines as may be considered natural branches of the parent line, and to lease for a long period such larger schemes as they have promoted. Where such new schemes, however, are of sufficient magnitude to support themselves independently, and are not so intimately connected with the parent line as to be necessarily worked along with it, it may in some cases be advisable to make some provision for the existence of a degree of independence and local management in the new concern; and also for limiting the period during which the union of interest is to exist without the necessity of a fresh application to parliament. We refrain, however, from entering more particularly upon the details of such cases, since they are necessarily brought fully under the cognizance of the committee on each bill, in the course of the general investigation of the merits of the projected lines which it is proposed to amalgamate with existing companies; and we shall confine our observations more especially to those in which the amalgamation of existing independent companies is proposed, and in which the bearings of the case upon public interests are not necessarily brought under consideration by opposing parties. With regard to these, we incline, under present circumstances and on the whole, to the opinion that such amalgamations should only be allowed where there is a natural and manifest identity of interest for public purposes among the different portions of railway which seek to unite into one whole. For instance, when two or more lines form continuous portions of what is evidently, for permanent public purposes, one great line of communication, or whenever in fact there can be any reasonable doubt that, if the whole system were now proposed for the first time, an integral scheme would obtain a preference over separate and unconnected portions, we think that the benefits which we have already pointed out as likely to ensue from unity of management may be considered as sufficient to justify the sanction of amalgamation under proper guarantees and conditions. But where there is any appearance of any conflict of interest

between the companies proposing to amalgamate and the public, and if there be any reason to suspect that the amalgamation is sought as a defensive measure to ward off legitimate competion, or to prevent new and useful projects from being brought forward, it appears to us very undesirable that amalgamation should be permitted. And even in cases where there is no very evident interest adverse to the public at the present moment, but where there is no such natural identity of interest as properly to unite the lines proposing to amalgamate into one whole, we think, that having regard to the present fluctuating state of railway affairs, it would, generally speaking, be more prudent, at any rate for the present, to pause before sanctioning such proposals, and uniting irrevocably, or for long periods, companies whose relations to one another might in a few months have been entirely changed, or which might be discovered to have some unforseen interests adverse to those of the public. We are the more inclined to recommend this course, as no great evil could result from the postponement of such amalgamations for a year or two, by which time further experience will have been gained, both of the true interests and relations of the company and of the public, as well as of the efficacy of any legislative provisions against undue monopoly. In the present state of experience, it would hardly be wise to trust much to such provisions, unless in cases where they shall be seconded by an obvious coincidence of interest between the company and the public. There is also reason to believe, that many of the benefits sought for by amalgamation may be obtained without unions of this permanent character, by mileage arrangements, arrangements for the supply of locomotive power, and others of a similar description, which would not be open to the same objections; and this, in our opinion, forms another reason why, in cases which are at all doubtful, the more prudent course would be to postpone, for the present, the concession of powers to carry into effect lasting amalgamations."

Mathematics as a Branch of Professional Study.

There is so much plain good sense in an article on professional education which we have found in the Mechanics' Magazine, that we give it without curtailment, and shall continue our extract, if other parts should be as much to the purpose.

"It cannot be denied that the kindred professions of architecture and engineering require to be based upon principles in pure mathematics; still less can it be denied that the professors themselves are *in general* but little versed in that essential branch of their respective professions. In fact, we can hardly take up a professional book, in which there is the slighest approach to mathematics, without feeling convinced that the author is handling unfamiliar, and often lacerating his professional character by his clumsy use of them. Often have we felt a suffusion of shame when consulting works of the most eminent men in these professions, and stumbling on their ludicrous attempts to talk mathematically; and we have felt pleased in thinking that such jejune productions do not fall under the eyes of mathematicians. They know too well that our professional works contain nothing calculated to repay the trouble of perusal, much less the expense of purchase.

"Yet problems of great, very great mathematical difficulty, are daily occurring in both professions. What is the consequence? That our architects and engineers are compelled to trust to unsatisfactory and illusive experiments with models, or to risk at once the consequences of their conjectural designs. They sometimes succeed—*often* when they keep pretty close to older and tried plans—but occasionally the most lamentable failures take place,and sometimes attended with fearful loss of life as well as property. A moderate portion of mathematical skill would have prevented these and other evils.

"Again, the unnecessary strength given to parts of a structure, and unnecessary demand of generative power in machines, are so common, that there are perhaps few buildings or machines at present in existence which form entire exceptions to the charge. Now the strength of a structure is, in reality, the strength of its weakest part, and even the weakest part may be weakened still more by its connection with the other parts; and the power of a machine is only that part of the initial force which is effectively conveyed to the 'working points,' All else is wasted, whether of strength or power; and, in fact, so much capital might as well be thrown into the ocean at once, as employed in these unprofitable parts of a structure or an engine.

"A competent knowledge of mathematical science would enable the professional man, *in a very great degree*, to avoid this profusion of expenditure, and in nearly every case to prevent those frightful catastrophes that are periodically occurring from falling buildings and exploding machinery. Even on the inquests to which these terrible fatalities give rise, the conflicting and often very absurd testimonies and opinions of professional men are most remarkable; and they are gradually convincing the public that the professors themselves are destitute of all accurate knowledge of the *principles* of their own art, and are guided by mere empirical rules, the slightest departure from which becomes professional temerity, and a most wanton sporting with property and life! Is this as it should be?

"Were architecture and engineering empirical arts—were it not possible to determine *a priori* the results of all strains and pressures in a building, and the loss of power attendant upon any given train of machinery—were it not possible to compute, by unerring rules, the actual force and its direction at any given point, either of a structure or a machine—then indeed, this reproach could not lie at the door of either profession or of its institute. Since, however, *they need not be* empirical professions, and as a comparatively moderate acquaintance with mathematical science would redress the greater part of the wrongs which professional ignorance inflicts on the public, it behooves us to make such corrections ourselves, lest they be forced upon us in a more galling form by the decision of the legislature. In fact as any person no matter his ignorance of all that relates to the subject, may at his pleasure dubb himself "C. E." or "Architect," and as in the recent railway mania, so many of the most unprincipled and unpractised persons have thrown themselves into the engineering profession, we need not wonder, nor, indeed, should we be sorry to see it, if the legislature should find it necessary to exercise a control such as it does in *law* and *medicine*. It certainly does seem necessary to put some restriction upon the power of incompetent persons to enter these professions; and no mode seems so practicable as a charter of incorporation and a board of examiners to decide upon the qualifications of candidates in each of the professions. We are sure it would be a boon to the public, and not less a boon to the professions themselves. It would secure to the public qualified artists; it would remove from the professions that load of discredit which the present open system inevitably entails upon them, and with increasing accumulatien each successive year.

"We scarcely, however, hope to see this desired consummation yet; but we do know, from many letters which we have received, that a great number of the younger members of both professions are anxiously desiring to *qualify themselves* for an efficient and honorable execution of their duties. We have often been requested to point out a suitable course of study and reading in mathematics, which shall mainly, if not wholly, have a direct professional bearing—including all the great features of what is essential, and precluding those inquiries which. however interesting to professional mathematicians, are superfluous to professional architects and engineers. Yielding to none in our wishes to be 'useful in our day and generation,' we shall attempt to point out not only the subjects, but the manner of study which appears to us to be best adapted to the end in view; and we trust that should the day come—which we yet hope to see—when some test of capability for professional duties shall be rendered legally imperative, the suggestions which we may offer will have proved a beneficial aid to many a one qualifying himself, who would otherwise have been unable to do so, in that most important branch of his acquirements, the *mathematical*.

"Although large premiums are paid with articled pupils both to architects and engineers, we believe there is not a single case producible, in which the slightest attention to mathematical studies is included in the course of professional instruction. How, indeed, should there be? The youth may be advised, or he may not be, 'to get a few lessons in mathematics from some private teacher;' but in most cases the advice will be looked upon as a bore and perhaps given with a half sneer; and even if adopted, he is left, like his tutor, in the dark as to the nature and character of the mathematics that he wants. He blunders through a few lessons, gets disgusted, and his mathematical course is finished with the payment of his first guinea!

"A few years ago an attempt was made to procure for young men a preliminary scientific education, prior to their going into articles, and a 'college for civil engineers' was formed on the *joint stock* principle, which after a while settled down at Putney. It was, however, a mere commercial speculation, and fared as a great number of that class of schools have fared, in becoming all but insolvent. A *military governor* was selected, and a system of *military regulations* and practices was adopted for training boys for *civil and scientific employments!* A good deal of curious matter is connected with the history of this institution; but the military system not only failed to produce good scholars, but it succeeded in creating a spirit of reckless dissipation that rendered it a scandal and a nuisance to the district in which it was 'located.' In fact it was all but bankrupt in means, as it actually was in character. We are, however, much gratified to learn that *now* its character is totally changed; that social decorum and gentleman-

like conduct as much distinguish the present race of students as the former race were oppositely distinguished. But it is now under the direction of a civilian and a clergyman, with absolute power over all the arrangements and details of the institution. We hear on all hands that its proceedings are judicious and effective; and with the belief that such is the case, we wish it all prosperity!

"This college, however, can only educate a small number in comparison with the annual influx of youths into professional offices. It is for the use of those who have no other director that we write. Throughout our series of articles we shall keep the one grand end in view—that of mathematics required by the practical architect and engineer.

"It might seem to some of our readers that while we reflect upon the present imperfect state of mathematical knowledge in the civilian professions, we ought also to notice the condition of the military, or royal engineers. Seizing, as they do, upon the 'good things' which government has to bestow, and looked up to by the public as men immensely superior in abilities and learning to the civil engineer, it is natural for us to scrutinize *their* system of training, and the degree in which their exalted pretensions are borne out by facts. Educated in a school set apart for the one object of preparing the ordnance officers for their onerous duties, we should be led to think that their training was in every way a model of theoretical and practical education. Alas!

(From the Journal of the Franklin Institute.)

Obituary of the late GEORGE CRANE, ESQ., *the founder of the Anthracite Iron Manufacture. By* SOLOMAN W. ROBERTS, *Civil Enginer.*

George Crane, Esq., the founder of the anthracite manufacture, died at his residence, near Swansea, South Wales, on the 10th of January, 1846, in the 62nd year of his age. Mr. Crane was a native of Broomsgrove, Worcestershire, and for fifteen years was engaged in the hardware business in Birmingham, from which he retired about the year 1820, with no intention of again engaging in business; but, becoming tired of an idle life, he visited Wales in 1823, and commenced making iron at the Yniscedwin works, which then consisted of one small blast furnace.—Those works are situated in Braconshire, in the picturesque valley of the Tawy, a small river which flows into the Bristol channel at Swansea, and they are thirteen miles from that port. When Mr. Crane took charge of them, and for a long time after, the smelting iron ore found in the vicinity was carried on with coke made from bituminous coal; but, as an extensive field of anthracite coal existed in the neighborhood, was early turned to the importance of bringing that fuel into use; and at different periods, during fourteen years, he had, at a large outlay, tried a variety of plans to effect the object.

Though repeatedly baffled he still persevered, and his efforts at length were crowned with complete success. Finding that the use of this hard and refractory fuel caused his furnace to chill, he resolved to try the effect of heating the blast to a temperature sufficient to melt lead, upon the plan so successfully introduced by Mr. Nielson, for increasing the yield of furnaces worked with bituminous coal. Having made the necessary preparations, he began the experiment with the hot blast on the 7th of February, 1837, in a furnace forty-one feet high and eleven feet in diameter at the boshes. From that date until he 12th of March the furnace was worked with roasted anthracite as the only fuel, and thenceforward exclusively with raw anthracite as it came from the mine without any preliminary preparation. In all respects Mr. Crane's success was complete; his furnace worked well, the yield was better than with coke, and the iron was of superior quality. He felt that the problem to which so many experimenters had turned their attention, both in Europe and America, and to which he had depoted so much of his time, was triumphantly solved. He had accomplished the object on an extensive working scale, with continued and increasing success; and from this period dates the establishment of a new and important manufacture, from which the iron trade, both of Great Britain and the United States, is now deriving great advantages. The writer of this notice, who was at that time sojourning among the iron works in Wales, visited Mr. Crane's establishment in May, 1837, for the purpose of seeing the process and of satisfying himself that the materials used were similar to those which exist so abundantly in Pennsylvania. Finding that the great object was accomplished, and that the results were highly gratifying, he communicated the fact to his friends in Philadelphia, by whom it was shortly after made public through the newspaper. At that time there was no blast furnace in Pennsylvania working with anthracite coal; their number in the state is now 27, and there are several in New Jersey.

At the meeting of the British association for the Advancement of Science, held in Liverpool, in September, 1837, Mr. Crane attended and presented a paper descriptive of his process, which is printed in the sixth volume of the proceedings of that association. He had secured a patent in Great Britain and had applied for one in the United States, the issue of which was for some time delayed, owing to obstacles which grew out of the premature publication of his process. When great difficulties have been overcome by simple means men are prone to depreciate the inventor, and in proportion to the number of the individuals and to the importance of the interests benefitted, is the pertinacity with which his claims are contested. After he has made plain a path before untrodden, his merits are questioned as those of Columbus were by the Spanish courtier, whom the great Genoese so keenly rebuked by placing an egg on its end. Mr. Crane's case formed no exception to this general rule. His patent was infringed, and he became involved in a tedious and expensive litigation which some of his friends feared might end in his ruin. At length, however, the question as to the validity of his British patent was decided in his favor, and thenceforward it became a source of much profit to him. He extended his works at Yniscedwin by the erection of several additionol furnaces, and his concerns became highly prosperous. The validity of his patent in the United States has not been tested, although his process is extensively used. He consulted the writer of this notice as to the expediency of entering into litigation on the subject in this country; who in reply compared the case of Mr. Crane to that of Eli Whitney, the inventor of the cotton gin, the value of whose invention to the public made it the source of such vexation to the patentee. Mr. Crane is undoubtedly entitled to the honor of being the first to establish the smelting of iron with coal. At the time he succeeded, the business did not exist, and ever since it has gone on increasing. In testimony of this, the important works of the Lehigh Crane iron company have been named after him, which were erected and are carried on under the able superintendence of Mr. David Thomas, who was sent out from Wales by Mr. Crane for that purpose.

Having lived long enough to see the object on which his heart was set completely accomplished, Mr. Crane died suddenly from the effects of a painful accident. Being somewhat indisposed, he had received two small bottles containing medical prescriptions, one intended to be used internally and the other as a liniment; and by mistake, on the night of the 8th of January last, he accidently took the contents of the wrong bottle, which produced inflamation of the stomach and carried him off in two days, notwithstanding the best medical aid. He was a man of great excellence and purity of character, warmly attached to the Episcopal church, but liberal to those of different opinions. He was a friend to the poor and active in visiting and relieving the sick. He always provided for the widows and orphans of his workmen, and saw that their orphan children were educated. His active exertions to promote the general welfare and the moral and religious improvement of those in his service, furnish a bright example for the imitation of other iron masters. He died unmarried, but hundreds who were employed by him lament his loss as that of a father. He felt a lively interest in the preservation of peaceful relations between Great Britain and the United States, and took great pleasure in hearing of American prosperity. We have reason to trust that his spirit has passed from works unto rewards in a better and more enduring country.

Philadelphia, March 4th, 1846.

File Cutting by Hand and by Machinery.

Many use files, but few know the amount of labor bestowed upon them, or the nicety of touch required in the workman. It would seem that machinery here cannot operate, that it cannot think.—The best information on this subject is in the French Dictionary of Arts, etc.—meanwhile something may be learned from the extract we give below:

"Files are indispensable for the working of all metallic and many other hard substances, and without their aid few articles of machinery could be produced. Holland observes that the use of the file must have preceded every step in the progress of finishing articles composed of iron and steel in all cases where any intricacy of shape precluded the

operation of grinding. He considers that, great as is the antiquity of the revolving grindstone, the file must have preceded it, and refers, in confirmation of this opinion, to the first book of Samuel (chap. xiii. v. 21,) in which the file is mentioned as the means of sharpening the mattocks, coulters, and other edged instruments of the Israelites.—He also refers to a passage in the Odyssey, in which Vulcan is represented as using the hammer and file in fabricating the net in which he entangled Mars and Venus, as a proof of the great antiquity of this tool.

"Files always are, or should be, made of steel of superior quality, as there are few instruments in which a defect in the metal is so completely destructive of utility. An axe, saw, or almost any other cutting instrument, though of inferior metal, may be made to do its duty by repeated whetting; but for a bad file, as Holland observes, there is no remedy —no process of restoration. 'Let it,' he says, be too soft, and immediately on application, he whole toothed surface of the file is crushed down, and ceases to be of any use for its intended purpose; if too hard, on the other hand, the teeth, as soon as they come into contact with the body to be acted upon, fly off with every stroke; the file thenceforward becoming, if not quite useless, certainly a coarse irregular rubber.' The importance, therefore, of a guaranteé of excellent quality gives a high value to files bearing the marks of manufacturers of established reputation, and leads unprincipled tradesmen to imitate them. 'One of the most famous of these marks,' Holland observes, 'was that granted many years ago by the corporation of Sheffield to Daniel Brammall; and as an illustration of its value may be mentioned the fact, that in 1825 the rightful user obtained a verdict of £2000 damages against a Birmingham file maker for having struck it fraudulently on articles made by himself.'

"Several highly ingenious machines have been contrived for superseding the tedious operation of file-cutting by hand, but we believe no file-cutting engine has been brought successfully into operation. One very serious difficulty arises from the circumstance, that if one part of the file be either a little softer than the adjacent parts, or narrower, so as to present less resistance to the blow of the hammer, a machine would, owing to the perfect uniformity of its stroke, make a deeper cut there than elsewhere; 'whereas,' as Dodd observes, 'a workman who has been employed in the trade from a boy (and none others, it is said, can acquire the requisite skill,) can feel instantly when he arrives at any variation in the quality or condition of steel, and once adapts the weight of his blow to it.'—Holland, after describing one of the machines contrived for this purpose, observes, that the applicability of such an apparatus to the toothing of extremely fine faced files seems conceivable, because 'in such the *set* or direction of the teeth is a matter of much less importance than perfect equality of surface;' thus intimating that a great difficulty arises in this apparently attainable point. 'The double dead-cut files of the French,' he adds, 'exhibit such a beautiful uniformity of delineation when examined with a magnifier, that no doubt seems to be entertained, by many persons conversant with the art, of their being cut by machinery of some sort. But although the French are so successful in the production of this exquisitely delicate cutting, they are not equally so in the execution of the rougher sorts; and, consequently, English files are in high reputation in Paris, whither large quantities are regularly transmitted.' The writer mentions a French manufacturer of watchmakers' files, some of which, cut in the common manner, but with exquisite neatness, by his daughters, were regarded with suspicion by many, simply from the opinion that they must be machine cut.

"During the war of the French revolution, the supply of English files being impeded, the French file makers were excited to great efforts to supply the deficiency, and according to an article published in the Repository of Arts for 1801, translated from the register of the French Lyceum, it would appear that a man named Raoul succeeded in producing files so hard that they would cut or abrade the best English files which, in a series of public experiments, were brought into com petition with them."—*Penny Encyclopædia Supplement.*

Khorassan, or Turkish Mortar.—Khorassan is used for the construction of mosques, reservoirs, and other buildings requiring extraordinary solidity. It is composed of one-third bricks and tiles, pounded to the consistency of road-scrapings, and two-thirds of finely-sifted lime, with the necessary quantity of rain water. When employed the mortar is laid on in layers of from five to six inches in thickness between each range of bricks or stones, the latter being dipped or sprinkled with water, to augment to adhesion. Khorassan, still in common use, was employed by the early Byzantines, as is proved by the remnants of their churches and cisterns. It was borrowed from the Arabs, who took it from the Persians, and called it Dakik ul Karf (Potter's Dust). —*Idem, vol. i., page* 312.

The Scourge Steam Bomb-Vessel has been fitted with an electro-galvanic apparatus for transmitting communications from her paddle boxes, or bridge connecting them, into the engine room, whereby, in any kind of weather, day or night, the proper directions may be given to the engineers for their guidance, instead of the mode at present adopted of shouting down below, "go on," "ease her," "back her," "stop her," etc., etc. The apparatus being portable, may be moved to any part of the vessel, and is therefore not confined to the use of the officer or the bridge or paddle boxes; so that the steersman may have it, or the "look-out" forward.

Lukium, or Turkish Plaster.—The impervious and adhesive qualities of this composition, which is remarkably simple and durable, are so efficacious, that although some Taksim (tanks) are entirely beneath the earth, and thus perpetually exposed to outward infiltrations as well as inward pressure, and undoubtedly coeval with the earliest Byzantine monarchs, yet there is no record of their requiring repair, or of their having ever leaked. Water pipes of burned clay or metal joined and coated with lukium, which, when dry, becomes as hard as stone, resists the effects of humidity for ages. The following is the receipt, as now used by the Lou Yolgee (Waterway-men): Take 100 lbs of fresh kilned lime, finest quality, reduced to powder; ten quarts of pure linseed oil; and one or two ounces of cotton. Manipulate the lime, gradually mixing the oil and cotton in a wooden trough, until the mixture assumes the consistence of loaf-dough. Let it dry, and then break it into cakes for store or use. When required for the latter, take a sufficient quantity, moisten it with linseed oil, and with this paste give two or more coatings to the wall or pipes, allowing each coat to dry. Pipes of metal or clay can be hermetically joined by twisting well-carded hemp, saturated with lukium, round the interstices, and making it fast with cord also dipped in the mixture. —*Three Years in Constantinople, by C. White, vol. ii. page* 31.

Scientific Coincidence.—In 1815, Captain Smith ascertained trigonometrically that the height of Mount Ætna is 10,874 feet. The Catanians, disappointed that their mountain had lost nearly 2,000 of its reputed height, refused to acquiesce in the decision. Afterwards, in 1834, Sir John Herschel, who was unaware of what Captain Smyth had done, determined by careful barometrical measurement that the height was 10,872½ feet—showing a difference of 1½ foot. Herschel called this coincidence a happy accident; but Dr. Wollaston well remarked that "it was one of those accidents which would not have happened to two fools."

New Light.—M. Gaudin, of the French navy, has invented a new light which he proposes to have on board ships, so as to prevent accidents at sea. The apparatus consists of a reservoir of oxygen, from which the gas flows under a pressure of mercury, and enters a flame produced by ether or spirits of wine through a small aperture at the axis of the wick, and the light thus oxygenated is thrown upon a piece of magnesia fastened to a thread of platina. The lamp in which these are placed has a reflector, and the whole is enclosed, with aperture for air, in such a way as to be safe from external injury. M. Gaudin is of opinion that this light may be applied with great advantage to railroad locomotives, as well as vessels at sea, and the expense does not appear to be at all in proportion to the important service that it would render.

Rust.—All the common metals, except tin, rust; they become duller and duller up to a certain degree, lose gradually their lustre, and then the process goes no further. Instead of this rusting being a destroyer of the metal, it is a preserver; for, even in the case of iron, which rusts quickly as compared with other metals, if it be dipped into tin, it comes out coated with it, and it is preserved beautifully. If iron be exposed for a couple of hours to the action of water, the iron becomes quite corroded; but when tinned, the iron is protected, and the tin itself appears unaffected. How is it that this metal can protect itself, and the iron that is under it? It is simply owing to the substance formed on the surface by the attraction of oxygen, which is so adherent to the metal beneath. It gives a protection which no varnish, or any other kind of application can afford. Take a copper or tin plate, they are both protected in their metallic state by a thin coat formed in the first instance of oxide. It is only because this coat is so exceedingly compact, close, and adherent, that it passes for nothing—a mere film or tarnish.—You think you see, or touch, a piece of tin; you cannot detect the film, except by close examination. We know it is there, but it is only by optical phenomena that we can measure its thickness. It seems clean and beautiful, but if you rub it off, you give the metal beneath a new character; the beautiful lustre, however, passes off the first moment up to a certain point. The body formed by the combination of oxygen with iron is different. The oxyide does not adhere to the metal beneath; it forms upon it little spots, or porous tumuli. It is not an investing varnish, but the process goes on through the pores of the rust, especially if the metal be placed in a damp atmosphere. This is the reason why we find a difference between copper, iron, tin, and lead, when used for roofs or other external purposes. The iron alone is eaten into and destroyed, by this want of adhesion in its rust to the surface of the metal. "It is curious to observe, in some cases, how tin, a metal having a slight attraction for oxygen, protects other metals from oxidation. In Canada, tin plate is used for the roofs of houses; I am told that you are dazzled by the lustre of the setting sun upon the roofs; and there, although it is exposed to the atmosphere year after year, it does not decay, because the superficial coat of oxide protects the tin and iron beneath."—*Faraday.*

Correspondents will oblige us by sending in their communications by Tuesday morning at latest.

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AMERICAN RAILROAD JOURNAL.

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Saturday, May 30, 1846.

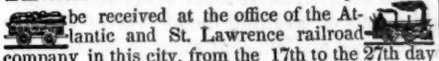
Reading Railroad.

We have been courteously favored by Mr. Augustus Edwards with the following comparative statement of the business upon this road during the month of April, in the years 1844, 1845 and 1846—from which it will be seen that the increase is truly astonishing. We are gratified to be able to say that we shall hereafter receive and publish regular weekly statements, by which our readers will be able to observe its progress.

A comparative statement of the business on the Philadelphia and Reading railroad for the month ending April 30th,

	1844.	1845.	1846.
Travel.....	$8,008 48	$8,919 13	$13,340 42
Freight on goods.	4,531 85	7,248 39	15,764 90
Do. do. coal..	29,532 05	51,225 32	125,417 05
Miscell's receipts.	13 55	——	3 00
Transp. U.S. mail.	500 00	783 33	783 34
	$42,585 93	$68,176 17	$155,308 71
Coal trans., tons..	30,099	52,734	100,018

ATLANTIC AND ST. LAWRENCE RAILroad.—Notice to Contractors.—Proposals will



be received at the office of the Atlantic and St. Lawrence railroad company in this city, from the 17th to the 27th day of June next, for the grading, masonry and bridging of a division of the road, extending from a point at or near Portland to Royall's river in North Yarmouth—a distance of about eleven miles.

Plans, profiles and specifications will be exhibited, and the requisite information given at the engineer's office in Portland on and after the 17th day of June.

Persons offering to contract for the work, or any part of it, who are unknown to the undersigned or the directors of the company, will be required to accompany their proposals with references as to character and ability.

A further extension of the road, embracing a distance of some fifteen or more additional miles, will be prepared for and put under contract about the first of August next.

By order of the Board of Directors.
WM. P. PREBLE, President.
A. C. MORTON, Chief Engineer.
Portland, Me., May 18, 1846. 1m22

Camden and Amboy Railroad Company, and Raritan Canal, and the Napoleon Transportation Companies.

The question has been often asked, "Why is it that the Camden and Amboy company does not pay over 10 or 12 per cent. to the stockholders?"

Never, until recently, have we been able to answer this question.

We were credibly informed a few days since, that the *Transportation company* between this city and Philadelphia, via Camden and Amboy railroad company, was not in any way connected with the railroad company. It is, in fact, entirely separate. The name of this company is, we understand, the *Napoleon* Concern. The principal portion of this stock is said to be owned by the *directors* of the Camden and Amboy railroad, and Delaware and Raitan canal company (which is, in fact, one and the same thing) and the directors have the power of raising or reducing the tolls as they choose.

The original cost of the "Napoleon" shares was $500 each. None have ever been, within our knowledge, offered at the board of brokers, either here or in Philadelphia. We have heard of two shares that were some time since offered as a *particular favor* for $1500 each!

We leave the public, for the present, to form their own conclusions, but shall have *more anon* to say on the subject.

☞ *The Oswego and Syracuse Railroad Company*, we learn, was organized the 14th instant, by the selection of seven of the business men of Oswego as directors to represent that place, three from Syracuse, two from Utica and one for the city of New York. The Hon. Alvin Bronson was chosen *president*, Luther Wright, *treasurer*, and Messrs. Bennett, Doolittle and Osborne, the *executive* committee.

It is of the first importance, now that the western trade is let down into lake Ontario by the Welland canal, that this important link of 36 miles should be completed without delay. This is the more required, as we learn the Ogdensburg and Champlain railway stock has been subscribed, and the company organized, under influences, to say the least, not favorable to the city of New York. We have, in a former number, pointed out the importance, aye, absolute necessity of the Harlem railroad being extended so as to form an intersection with this line of northern railways, either by Chatham four corners, or by the valley of the Housatonic.

The distance from this city, on the extension of the Harlem railway, to Albany, 147 miles, and a like distance from that place to Oswego, two hundred and ninety-four miles, can be accomplished with ease in ten hours, at the rate of thirty miles an hour; but say twelve, to take the evening boat to Lewiston, then the railway, and breakfast either at the falls or Buffalo. The route via Oswego must have its full share of travel and traffic, and is of the first importance to our packet system, as forming the shortest line from the seaboard with Canada.

Responsibility of Directors.

The large number of important lines of railroad now in process of construction or about to be commenced, has led us to reflect upon the great responsibility of directors, and the influence, for good or evil, which they must exercise over the interests of companies. We think that already the various influences, in different districts dependent upon the character of the directors, are producing results of vast magnitude, partly beneficial and partly injurious to the general interests of railways.

Trusting that this subject, so seldom brought before the notice of those whom it most concerns, may soon receive its proper amount of attention, we propose to note a few of the more important duties of railway directors.

The first, and most urgent duty, is *attention to the affairs of the company.* One would suppose that in common honesty no man would suffer himself to be elected to an office of trust, the duties of which he did not intend to fulfil; but no fault is more frequent than this. Men in active business are most generally elected to fill such situations, and their excuse for non-fulfilment of duty is, *they have no time.* Then, most assuredly, they have no business to retain their office. If a capital of one, two, three or more millions, is confided to the management of twelve or twenty men, it is done, most certainly, with the understanding that the interests of stockholders shall not be neglected; and such neglect on the part of a director is a virtual, and should be made an actual, resignation. We throw out a suggestion derived from the experience of the incorporation of a literary institution, which, in common with all others of its kind, had suffered from the evil of which we are speaking. On the absence of a member for two successive meetings of the board, he receives a notice of warning, and if absent at the next meeting, unless from sickness or some satisfactory reason, he is requested to resign, in order that his place may be filled by some one able and willing to discharge the duty. It would be an easy matter to provide in the charter, or otherwise, for the legal vacation of office on account of prolonged absence.

Possibly this evil, as well as all others of the kind, may have been increased by the election of *show-men*—respectable gentlemen who care not a fig for the concern, but are elected directors for their names only. In this case, the sin is about as much on one side as on the other, and the result pretty much the same as in all other measures of mere expediency—the very thing intended to be accomplished is defeated by the means employed to bring it about.

In its broadest sense, the fault of which we have been speaking includes all others, although we have rather referred to punctual attendance and the intention to perform what is required.

But with the most honest intentions and most faithful personal presence, a director may yet neglect the interest confided to his charge. He may, in short, be ignorant of railroad affairs. The second great duty then is *a knowledge of what has been done and is doing upon other works—general information upon railway construction and management.* It is true, the company should have a competent engineer, but the responsibility of the adoption of his plans rests with the directors, who are often called upon to decide questions which a professional man may consider not to belong to him, although he may have, and even express, an opinion. We are certain that no skilful engineer would be displeased at a thorough investigation of his projects—setting aside all impertinent interference—and we are equally certain that he would feel greater satisfaction in finding his plans adopted because they were excellent, than in seeing them swallowed because they could not be understood.

Railroad directors then should, by actual examination, carefully and faithfully made, become acquainted with the construction, the management and the condition of other roads than their own. The excuses which may be made for not doing so, are not to be heard. The dilemma is, such persons must either be ignorant, or else know more than every body else without any means of acquiring such knowledge.

The details of management can scarcely be properly understood without personal examination—a regulation may look well but work ill. "All sorts and conditions of men" must be encountered, and, as a general rule, satisfied. This is no easy task, and its skilful performance demands an intimate knowledge of human nature; and in such a case surely, if in none other, it would be wise to benefit by the experience of others.

We could, were we disposed to particularize, mention several instances in which this ignorance of the experience of others, even in apparently very trifling matters, has led to unfortunate or even disastrous results.

The directors of the most successful railroads in

the country are emphatically *railroad men*—men who without being smatterers in professional matters, are yet informed of everything that belongs to railroads, and who lose no opportunity of adding to their information. Such men only are fit to be directors, and under such men only will railroads prove successful—that is, do not only well, but do all things they are capable doing.

There are many excellent men in such situations, good in business and possessing general information, who are yet, according to our standard, unfit for their places; but such men can, with little or no difficulty, become qualified, and upon such persons advice is not thrown away. In acquiring the information needed, they would be agreeably employed, and certainly the feeling that they were more faithfully attending to their duties would not be disagreeable.

Of course, the practice of making up directors of men who look upon railway stock merely as *stock*, is quite improper; and to such a cause might we trace the ruin of many a concern, which, under other hands, would have prospered. We do not mean to say that brokers and bankers are not fit for directors—there are many such who are, in our sense of the term, *railroad men*. Their fitness or unfitness turns not upon their being brokers or bankers, but upon their being, or being willing to become, *railroad men*.

In making these remarks, we have scrupulously avoided all direct or indirect application. This it will be easy to make in any particular case, but we have desired rather to leave the application to others. Doubtless opportunities will occur for the special inculcation of what we have here laid down in general terms, and from such opportunities we shall not shrink.

Separate Carriages or Divisions of Cars for Ladies, are finding great favor in England. The plan has been introduced on many of our railroads. The elegant cars, furnished with state rooms [as they are called], in use upon the Long Island, Norwich and Worcester, Stonington, and other roads, have been found very agreeable; the only suggestion we could make is, that if agreeable to ladies, for one part of the line, why not for all parts? A few fine cars are not enough to render the jonrney pleasant to those who travel in many common ones.

We never could see the particular advantage in thrusting 50 or 60 people, of all sorts and kinds, together into one large apartment, particularly when there is a red hot stove, and when some persons *will* toast their India rubber shoes until they smell, and others *will* throw their quids and spit tobacco juice upon the red hot iron.

The advantages of long cars are beyond a doubt; but there is no reason why the interior should be without division. Indeed the partitions might be so arranged as to add materially to the strength of the car.

The "Great Britain."

The information contained in the following extract had escaped our notice—but is what might have been, and was predicted, when this singular instance of misjudgement was first announced.

"What has become of the Gt. Britain?" is a question which we hear frequently put, and we have had frequently addressed to us. We now devote a corner to state what we know about her. The vessel is undergoing at Liverpool a thorough renovation of her machinery, previous to encountering the serious perils of another Atlantic voyage. If all we have heard be true, this renovation might more properly be described as an *entire re-construction*. The company of proprietors are now acting under the able advice of Mr. Field, of the firm of Messrs. Maudslay & Field, the constructors of the Great Western, whose performances, as a steamer, have never, as our readers are aware, been to this day surpassed. Well would it have been for the Great Western company had they only contented themselves with building *just such another*, instead of aiming at a leviathanism, which was wholly uncalled for, and which, as the event has proved, was quite beyond the reach of any engineering skill possessed by those who planned and built her. We have reason to believe that when the machinery of the Great Britain, as it is now in the course of being altered, comes to be compared with what it was originally, such a series of blunders as to dimensions, proportions, etc., will be brought to light, as the engineering public have rarely, if ever witnessed. How she should have been able, mis-engined and inefficient as she was, to make even the three halting voyages she did, is a marvel. Verily, it must have been of God's mercy that she did not share the fate of the unfortunate President.—*Mechanics' Magazine.*

We understand that the directors of the Atlantic and St. Lawrence railroad decided on Friday evening last, the question of the route of the road from this vicinity. The route adopted leads through the towns of Westbrook, Falmouth, Cumberland, and North Yarmouth, passing between the two villages, and so up the valley of Royal's river. This route is according to actual surveys about a mile and a half longer than the western route, so called; but it passes through a fine, well cultivated, and well settled country. It is 2¼ miles longer than the western route, according to Dearborn's survey—but that survey began near the foot of Preble street; the other embraces the whole distance to the wharves on Fore river.

Our friends at North Yarmouth, who are manifesting a very laudible interest in the enterprize, had quite a *jollification* last evening, on learning the decision of the directors in regard to the route for a location.

The chief engineer, it is said, will be in the city this week, and probably the location of the road as far as the valley of Royal's river will be completed very shortly, so that we may expect to see the directors in all this month advertising for grading the road as far as North Yarmouth.—*Portland Adv.*

(From the Journal of the Franklin Institute. for April.)

Civil Engineering--Steam Navigation.

Through the courtesy of the Hon. George Bancroft, secretary of the navy, we are enabled to lay before our readers, part of a large mass of very valuable information upon the subject of steam navigation, in the possession of the navy department. It is contained in replies to a circular of the board of navy commissioners, which was addressed to many practical men, as well as to other persons, and men of science supposed to be conversant with the subject.

The great importance of the subject would make these letters interesting at any time; but at the present moment, when public attention is directed to ocean navigation, and our citizens are about to contend with the English for a share at least of a trade which has heretofore been exclusively their own, the value of such information will be more fully appreciated. The projected mail steamers to Cowes and Bremen, and other ports; the Liverpool packets with auxiliary power, and the proposed increase of the steam navy of the United States, lend force to this remark, and give to the subject an unusual importance at the present time.

These letters were written in 1841, nearly five years ago, and great and radical changes have since been made in the arrangements of steam vessels. The English marine engine, with side levers and paddle-wheels, then in almost universal use, first gave place to various kinds of direct action engines, and now the old time-honored paddle-wheel itself seems about to be superceded, for marine purposes, by various kinds of oblique propellers. To the genius of Ericsson in this country, and the perseverance of Mr. B. F. Smith in England, this change is due; and the new systems introduced by them seem destined to effect a complete and speedy revolution in ocean navigation.

It is therefore highly desirable, that more recent information than that contained in these letters, should be obtained, and it is hoped that they may arrest the attention, and enlist the pen, of some one who may have the leisure and inclination, as well as the ability, to do the subject justice. Perhaps the writers of these letters may themselves be disposed to furnish such additional information as subsequent experience may have taught.

COM. PUB.

Circular to the Board of Navy Commissioners relative to Steam Navigation, and Replies thereto.

NAVY COMMISSIONER'S OFFICE,
3d September, 1841.

GENTLEMEN:—The commissioners of the navy, being engaged in providing an additional steam force for the navy, which has been authorized by a late act of congress, are desirous of availing themselves of the most approved and efficient plans of engines, boilers, and their fixtures. With a view to gain full information upon these subjects, they have taken the liberty of addressing this letter to some of the scientific and practically informed gentlemen of our country, requesting their aid on the occasion—persuading themselves that the information desired will be willingly afforded.

They beg to be favored with your opinion upon the following points particularly: 1st. As to the horse-power of the engine. 2d. The kind of engine. 3d. Should this be single or double? 4th. Should it be high or low pressure?

It is believed that high pressure engines may be used on board ships to advantage, by saving room, diminishing cost, and decreasing the labor. It is proposed to have them calculated for vessels of three sizes.—As their burthen is not yet determined, the commissioners would observe, that 500 tons will be the least, and 700 the highest limit, to which it is proposed to go in their construction; and they would be pleased to have an estimate for a vessel of 600 tons also.

Information as to the best form of the boiler, and as to the working of the different descriptions of engines; the horizontal, vertical, and angular, will be very acceptable. Indeed, any information upon any branch of

the subject, which you may be disposed to communicate, will be thankfully received.—You can best judge as to the information necessary to enable the board to come to a satisfactory decision upon a subject so deeply interesting to the whole community; and the commissioners beg the favor of you to afford it—not considering yourself in any degree restricted to the points indicated. I am, gentlemen, very respectfully, your obedient servant, L. Warrington,

For the Board of Navy Commissioners.

To the Navy Commissioners of the United States.

Gentlemen:—Your circular of the 3d inst. was duly received, asking our opinions upon the several questions propounded in relation to steam power in ships for the navy. We cheerfully submit the following reply, though we do so under disadvantages, from a want of a more specific description of the length, breadth and draft of water of the ves sels to be employed.

Assuming a vessel to be of 600 tons, we propose double engines, with an aggregate power of 120 horses. The question of preference as to high or low pressure engines for marine purposes, we are unable to decide with our present experience. We would, however, recommend high pressure, vertical engines, as an experiment of the form and arrangement of the model engines recently designed and made by us for commodore Stewart, of the navy, which are now at the navy yard in this city.

The advantages resulting from engines of that arrangement, particularly that with the vibrating piston rod, is a great saving of room and weight, great simplicity of machinery, and diminution of cost and labor in getting it up. Some of these advantages, particularly the simplicity of machinery, is less evident in a small model than in a full sized engine, arising from the necessarily distorted proportions of a small machine. Should the commissioners examine these models, it will afford us much pleasure to attend and give such explanations in relation to them as may be required. The same arrangement is equally applicable to low pressure engines, requiring in addition only the necessary condensing apparatus, which is readily arranged without a sacrifice of room. In recommending this engine in a vertical position, it is presumed that the power is to be applied to an ordinary paddle wheel. We will remark, however, that the same arrangement of the piston can be placed in a horizontal or an angular engine, producing the same proportionate advantages of lightness, simplicity, and economy of room, which it does in a vertical engine.

Should it be desirable to adopt the submerged paddle wheel of Lieut. Hunter, of the navy, which in our opinion possesses many important advantages for a ship-of-war, or the spiral propeller, our vibrating rod can be readily applied to them.

No specified plan of boiler appears yet to have been decided upon for steam vessels, as preferable to all others. That which we prefer for high or low pressure, is cylinder boilers, with fire-places passing under them, and thence through a large number of return tubes of two to three inches diameter. This arrangement gives great efficiency, compared with the weight and size of the ordinary boilers, is not subject to injury in the tube, from excessive heat, and is readily repaired by ordinary workmen, when repairs are required.

We do not hesitate to express the opinion that engines of this arrangement, either high or low pressure, can be made with a saving of 33⅓ per cent. of room, cost, and weight, with equal efficiency when compared with engines of ordinary arrangement.

As to the angular engines, they are only adopted when the arrangement of the machine requires more space in the line of power, than can be attained in a vertical position between the kelson of a ship and the cranks, or shaft. No other advantage, it must be observed, results from this position, it is evident that more space is occupied by it in a ship than by a vertical engine.

A single engine could be made of 120 horse power, which would occupy less space, and be made for less cost, than double engines of the same aggregate power; but it is believed that the uniformity of motion produced by double engines geared together at right angles, particularly in a rough sea; and safety, in case of accident, by working one engine, while the other is being repaired, overbalance all disadvantages which can be urged against the double engine.

It will always afford us much pleasure to reply to any communications from the government departments, upon any subject upon which it is presumed we can give information. Respectfully submitted.

(Signed,) Baldwin & Vail.

Philadelphia, September 28, 1841.

David Connor, Esq., *Navy Commissioners' Office. Washington City.*

Sir:—Your communication of the 3rd September came duly to hand;—being absent from home is the cause of not answering in due time. I am now making a drawing for a steam engine suitable for a vessel about 600 tons, calculating the hold to be 16 feet, and the draft of water, say, from the bottom of the plank, 12 feet; weight of engine, boilers, water, etc., 112 tons. The cylinder is upright or vertical, and is directly under the water wheel shaft; the piston-rod working through the bottom of the cylinder, connecting there to a cross head with a connecting rod on each side of the cylinder, to the cranks on the top of the same. This form of engine is the plainest that can be constructed of a low pressure kind; of which you will be best able to judge yourselves. One of this plan can be put up on board of a vessel of the same power, as is now putting up on board the Mississippi, for about one half the expense, and will be one-third lighter. The cylinder is 54 inches diameter, with a stroke of 6 feet 2 inches and is 211 horse power.

It is the same plan I had intended to make a working model on, at the time you were about making proposals for the two large steamers now building. I shall take great pleasure in giving you all the information I am able, according to your letter above referred to, of which I will be able to forward in all next week, together with the drawing of the same. Your obedient servant,

(Signed) Thos. Holloway.

Philadelphia, Oct. 1, 1841.

To the Navy Commissioners.

Gentlemen:—In your letter of the 3rd September, you ask for information on several points; I shall take great pleasure in communicating freely all the information I am able.

1st. Your inquiry as to horse power, etc. The horse power is so variously stated and differently calculated, it is a matter in question what a horse is equal to in power per day, hour, or minute. Suppose a horse to be able to draw 200 pounds at the rate of 2½ miles in the hour, or 220 feet per minute, with a continuance, drawing the weight over a pulley. Now 200×520=44,000, at one foot per minute, or one pound at 44,000 feet per minute. This will show that 44,000 is the divisor for a horse power.

To calculate the power, find the area of the cylinder, multiply that by the effective pressure of the steam say 10, 15, or 20. I say 15 pounds, the product is the weight the engine can raise, or press in, or resist in the water. Multiply this weight by the number of feet in length the piston travels in a minute, which will give the momentum or weight the engine can lift, press, or resist in the water, one foot per minute. Divide this by 44,000, and the quotient will be the horse power the engine is equal to.

On this sheet of paper I have calculated the power of the engine of which I have made the drawing, 54 inches diameter, and 6 feet 2 inches stroke.

2nd. My opinion is decidedly in favor of a low pressure engine. It has proved to give more power than the high pressure, when carried to great extremes, and is much more safe, more pleasant to work, and a greater saving of fuel, and has several advantages over the high pressure. This has been fully tested on the lakes, when on a large scale.

3rd. One engine placed in the centre of the ship will be a saving, on the first cost, of about one-third, and less hands will keep it in order, takes less room, much less in weight—more particularly a large engine on the plan on which I have suggested, is much the best. *This engine* has this advantage—the power is called a direct power within itself.

The English engine, say the *Great Western*, the power is conveyed in an indirect form by side lever beams, in which case the power passes through the ship, or through a great, massy, iron framing; is a very complicated engine, and has much friction to overcome.

Respecting Boilers.—The plainest boiler is the only safe one that can be used in salt or sea water, a boiler that can be got at on all the water side or surface, as that requires to be got at to be often cleaned. The fire sur-

face also requires to be got at to keep it clean from soot and ashes; and it is necessary that a boiler should be so constructed that the workmen can with ease repair it, when repairs are wanted.

The boiler I have given the outlines of, is what I call a zigzag entry boiler. It gives a large fire surface, and exposes much water to the heat. This boiler has a water bottom on which the middle legs are rivetted; this bottom is where the settlings are taken out. The boiler, although large, (say 16 feet 11 inches wide,) is just as strong as though it was 8 feet, for you will perceive it has two complete arches. By so forming, it can be put between decks, which is another advantage. With one boiler there will be less fuel consumed than with two.

I am in favor of an iron boiler. It is a boiler on which you can depend, and if tight, will last nearly as long as a copper boiler.—I have built several boilers on the plan mentioned, several years back, without water bottoms, which is an improvement both to getting at or discharging the sediment, and the manner it strengthens the upright legs; the boiler consumes but a small proportion of fuel compared to some others. There is a boiler now running on the Delaware which has been in use 11 years, and is considered by the owner to be as good as any one on the river at this time.

My method of proportioning the boiler to the cylinder in fire surface is as follows:—When a boiler is made of good proportion *as respects the draft*, and the fire surface being so that the fire can act on it; when there is 6½ feet surface allowed for every horse power, taking the within calculation, it will be sufficient even with indifferent fuel. This boiler will consume per hour 7 to 10 pounds, according to the strength of the coal.

An upright perpendicular cylinder is much the best. The friction is less, and the engine less liable to work itself out of order. An horizontal engine is the next best; but it has much friction to overcome, and is liable when put up on a large scale to work itself out of order; besides it takes more room in the vessel.

An angular engine is one of the worst; it cannot be balanced even; it is difficult to place the valves to it, without a loss of steam; and on the whole has many very bad qualities.

On this engine of mine perhaps you will inquire how it is to be packed, as the engine connecting shaft is directly on the cylinder top. There may be two large man doors on the top that can be taken up with half the trouble of lifting the whole top, and the men can pack the cylinder inside, when on the bottom centre. I am, etc.,

(Signed) THOS. HOLLOWAY.

Philadelphia, Oct. 11, 1841.

A steam engine the cylinder of which is 54 inches in diameter with a stroke of 6 ft 2 in., making 23 double strokes per minute.

Area of the cylinder, - - 2290
Carrying 15 lbs. of steam in boiler, 15
34350
12 ft. 4 in. × 23 (the number of double strokes,) - - - = 283½

44,000) 9738225 (221½

To COM. L. WARRINGTON, *Navy Commissioner, Washington City.*

SIR:—On my return from the survey of the boundary between the United States and the British provinces, I had the honor to receive your letter of 3rd September, requesting my opinion on certain points relating to the plans of steam vessels. While I fully appreciate the compliment which is paid me by considering that any hints from me would be of value to the board of navy commissioners I am only in return expressing my regret that my time is so fully occupied for the present in the service of a co-ordinate department of the government as to preclude my replying in so full and ample a manner as I could have wished. To give a reply which would be properly satisfactory, would include a draft of a vessel and engine. So far, however, as my leasure and existing circumstances will permit, I beg leave to state my views on the points you have submitted to me.

1st. In relation to the horse power of the engine, that term is so extremely vague, and the application of the usual mode of estimating the tonnage of vessels to steamers, so loose that I cannot reply in express terms to this question.

2nd. I consider that for a ship of war, an engine composed of two inclined cylinders, working at right angles to each other upon the same shaft, would be the best, in consequence of its occupying the least room, and having all its most important parts below the water line. One of the cylinders would be most conveniently placed before, the other abaft the shaft. In bringing this subject before the engineers, and naval constructors to whom the plan of the vessels will finally be committed, I would venture to suggest an idea I have long dwelt upon, and which I believe is capable of advantageous practical application. It is a fact ascertained from universal experience, that, in absolute contradiction of all theory, every foot which can be added to the velocity of the circumference of the paddle wheel gives an additional foot to the speed of the vessel. Our engineers have hitherto sought to attain this object by increasing the speed of the piston, and augmenting the diameter of the water wheel. So far as mere speed has been the object, this method has been successful, but the success has been attended with two obvious defects. (1.) The piston is driven at such a rate that the efficient pressure of the steam is much diminished, and hence the resistance which is overcome is very far beneath the estimate of the force of the engines in horse power by the usual formula. (2.) The wheel has been increased to such a diameter as to render the vessels crank, and would in a vessel of war expose an enormous surface to an enemies' fire.

I conceive that by recurring to the original form of Watts' engine, in which the sun and planet wheel was employed instead of the crank, these objections might be obviated. The property of this apparatus is to give to the shaft of a given engine twice as many revolutions as are given by a crank. A wheel of half the diameter, therefore, if thus driven, would have the same velocity at its circumference, as one of the ordinary dimension if driven by a crank; or, a piston moving with half the speed would give an equal velocity to a given wheel. It will be obvious that in planning a new engine both of these might be partially accomplished. The piston might be made to move slower, and the diameter of the wheel lessened, each to a limit less than half of what would be adapted to the use of the crank.

3rd. In my reply to the second question, I have proposed an engine consisting of two cylinders. This has, in ordinary cases, the advantage of much greater regularity of motion, causing less strain upon the vessel, and less wear in the engine itself. In a war steamer it would be further useful, as it would be possible to construct the engine so that either cylinder might be used independently, and thus, in case of an accident happening to one, the vessel would not be wholly crippled.

4th. The high pressure engine has the advantage of simplicity, and of being of less size and weight than the low pressure engine. It has also the advantage of giving a greater power with a given expenditure of fuel. The first of these advantages is counterbalanced by the increased risk with which its action is attended, and the second ceases altogether when the condensing engine is driven by steam of medium pressure, acting expansively. It is a matter of strict mathematical calculation, confirmed by the experience of the pumping engines of Cornwall, that steam working at a pressure of 56 pounds and cut off at one-eighth of the stroke, will do twice as much work in the same engine, at the same expense of fuel, as when it is used at a pressure of 2½ pounds, and not cut off. On the other hand, in order that a high pressure engine shall have double the force of a low pressure engine of equal dimensions, it must be worked with steam of a pressure of 300 pounds. I should, however, consider that steam of 56 pounds is rather beyond the limit of safety, as the inattention of a few minutes might raise it to an explosive height, and should advise that the boilers be calculated to bear about 30 pounds per inch, and the steam cut off at one-fourth of the stroke. In respect to the form of boilers, I should consider that borrowed from the locomotive engine as superior to any other, and that it ought to be furnished with a blower to adapt it for the burning of anthracite coal. I would also recommend that each boiler have a small separate engine for supplying it with water while the main engine is, from any cause, thrown out of action.

Such, sir, are the points on which I am at present prepared to give an opinion, and it would give me pleasure at some future period to reply at greater length to the important questions you have proposed. I am, etc.

(Signed.) J. RENWICK.

Columbia College, N. York, Oct. 4, 1841.

[To be Continued.]

WILLIAM R. CASEY, Civil Engineer, New York. Address Box 1078, Post-office, New York. 21

STEPHENS' RULING AND MECHANICAL Drawing Ink, for Engineers, Artists and Designers. This article will be found superior to the best Indian Ink for the above purposes. It does not smear with India rubber or wash off with water. It flows freely from the drawing pen, and never corrodes or encrusts it. It may be used on a plate or slab, with a camel's hair brush, diluting it with water, or thickening it by drying, as required. It has the advantage of being ready for immediate use.

Sold in conical-shaped bottles, convenient for using from, without any stand, at 15 cents each.

ALSO,

STEPHEN'S WRITING FLUIDS.

These compositions, which have so remarkably extended the use of the STEEL PEN, are brought to great perfection, being more easy to write with, more durable, and in every respect preferable to the ordinary ink. In warm climates they have become essential.

They consist of a Blue Fluid, changing into an intense Black color.

A Patent Unchangeable Blue Fluid, remaining a deep Blue color.

A Superior Blue Ink of the common character, but more fluid,

A brilliant Carmine Red, for Contrast Writing.

A Carbonaceous Record Ink, which writes instantly black, and being proof against Chemical Agents, is most valuable in the prevention of frauds.

Also, a new kind of MARKING INK for Linen and Inkstands adapted for preserving Ink from evaporation and dust.

Sold in Bottles of various sizes, by all Stationers and Booksellers.

Be sure to ask for Stephens' Writing Fluid.

N. B.—These unchangeable Blue Fluids are Patent Articles; the public are therefore cautioned against imitations, which are infringements, to sell or use which is illegal.

Stephens' Select Steel Pens.

The utmost possible care having been bestowed uuon the manufacture of these articles, so as to propcre the highest finish, they can be confidently recommended, both for flexibility and durability.

All the above articles are prepared by *Henry Stephens*, the inventor, No. 54 Stamford-street, Blackfriars road, London, and sold by Booksellers and Stationers in bottles of various sizes, and may be had wholesale from the agents in Boston, New York, Philadelphia, Baltimore, Washington, Charleston, New Orleans, and St. Louis.

Wm. W. Rose, Wall-street, New York, ismy general agent in the United States.

VALUABLE PROPERTY ON THE MILL Dam For Sale. A lot of land on Gravelly Point, so called, on the Mill Dam, in Roxbury, fronting on and east of Parker street, containing 68,497 square feet, with the following buildings thereon standing.

Main brick building, 120 feet long, by 46 ft wide, two stories high. A machine shop, 47x43 feet, with large engine, face, screw, and other lathes, suitable to do any kind of work.

Pattern shop, 35x32 fe. with lathes, work benches,

Work shop, 86x35 feet, on the same floor with the pattern shop.

Forge shop, 118 feet long by 44 feet wide on the ground floor, with two large water wheels, each 16 feet long, 9 ft diameter, with all the gearing, shafts, drums, pulleys, &c., large and small trip hammers, furnaces, forges, rolling mill, with large balance wheel and a large blowing apparatus for the foundry.

Foundry, at end of main brick building, 60x45½ feet two stories high, with a shed part 45½x20 feet, containing a large air furnace, cupola, crane and corn oven.

Store house—a range of buildings for storage, etc., 200 feet long by 20 wide.

Locomotive shop, adjoining main building, fronting on Parker street, 54x25 feet.

Also—A lot of land on the canal, west side o Parker st., containiug 6000 feet, with the following buildings thereon standing:

Boiler house 50 feet long by 30 feet wide, two stories.

Blacksmith shop, 49 feet long by 20 feet wide.

For terms, apply to HENRY ANDREWS, 48 State st., or to CURTIS, LEAVENS & CO., 106 State st., Boston, or to A. & G. RALSTON & Co., Philadelphia. ja45

RICH & CO'S IMPROVED PATENT SALAMANDER SAFES.—Warranted free from dampness, as well as fire and thief proof.

Paricular attention is invited to the following certificates, which speak for themselves:

TEST No. 10.

Certificate from Mr. Silas C. Field, of Vicksburgh, Mississippi.

On the morning of the 14th ult., the store owned and occupied by me in this city, was, with its contents, entirely consumed by fire. My stock of goods consisted of oil, rosin, lard, pork, sugar, molasses, liquors, and other articles of a combustible nature, in the midst of which was one of Rich's Improved Patent Salamander Safes, which I purchased last October of Mr. Isaac Bridge, New Orleans, and which contained my books and papers. This safe was red hot, and did not cool sufficiently to be opened until 16 hours after it was taken from the ruins. At the expiration of that time it was unlocked, when its contents proved to be entirely uninjured, and not even discolored. I deem this test sufficient to show that the high reputation enjoyed by Rich's Safes is well merited. S. C. FIELD.

Vicksburgh, Miss., March 9th, 1846.

Certificate from Judge Battaile, of Benton, Mississippi.

In October last I purchased one of Rich's Improved Salamander Safes, which was in the fire at the burning of my law office, and several adjoining buildings in this place, on the 17th of November last, at about half-past one o'clock A. M. of that day. The building was entirely consumed; and I take pleasure in stating that my papers in said safe were preserved without injury. A receipt book which was in said safe, had the glue drawn out of its leather back by the heat, and the back broken; but the leaves of the book, and the writing thereon, were entirely uninjured; and some of the writing which was of blue ink, was also left wholly unefiaced and not in the least faded. Said safe was by the fire heated perfectly red hot, and I do not hesitate to say, that said safe is a perfect security against fire. But the safe tumbled over during the fire, and being heated red hot, the outer sheeting of the door became pressed in, and the bolts of the lock bent, so that it could not be unlocked, and I had to have it broken open. JOHN BATTAILE.

Benton, Miss., December 27,1845.

Still other Tests in the Great Fire of July 19, 1845.

The undersigned purchased of A. S. Martin, No. 138½ Water street, one of Rich's Improved Patent Salamander Safes, which was in our store, No. 54 Exchange place. The store was entirely consumed in the great conflagration on the morning of the 19th inst. The safe was taken from the ruins 52 hours after, and on opening it, the books and papers were found entirely uninjured by fire, and only slightly wet—the leather on some of the books was parched by the extreme heat. (Signed,)

RICHARDS & CRONKHITE.

New York, 21st July, 1845.

One of Rich's Improved Salamander Safes, which I purchased on the 2d of June last of A. S. Marvin, 138½ Water street, agent for the manufacturer, was exposed to the most intense heat during the late dreadful conflagration. The store which I occupied, No. 46 Broad street, was entirely consumed; the safe fell from the 2d story, about 15 feet, into the cellar, and remained there 14 hours, and when found, I am told, and from its appearance afterwards, should judge that it had been heated to a red heat. On opening it, the books and papers were found not to have been touched by fire. I deem this ordeal sufficient to confirm fully the reputation that Rich's safe has already obtained for preserving its contents against all hazards. (Signed,)

WM. BLOODGOOD.

New York, 21st July, 1845.

The above safes are finished in the neatest manner, and can be made to order at short notice, of any size and pattern, and fitted to contain plate, jewelry, etc. Prices from $50 to $500 each. For sale by

A. S. MARVIN, General Agent,
138½ Water st., N. Y.

Also by Isaac Bridge, 76 Magazine street, New Orleans.

Also by Lewis M. Hatch, 120 Meeting street, Charleston, S. C. 16 tf

THE WESTERN AND ATLANTIC Railroad.—This Road is now in operation to Oothcaloga, a distance of 80 miles, and connects daily (Sundays excepted) with the Georgia Railroad.

From Kingston, on this road, there is a tri-weekly line of stages, which leave on the arrival of the cars on Tuesday, Thursday and Saturday, for Warrenton, Huntsville, Decatur and Tuscumbia, Alabama, and Memphis, Tennessee.

On the same days, the stages leave Oothcaloga for Chattanooga, Jasper, Murfreesborough, Knoxville and Nashville, Tennessee.

This is the most expeditious route from the east to any of these places.

CHAS. F. M. GARNETT,
Chief Engineer.

Atlanta, Georgia, April 16th, 1846. 17

RAILROAD IRON—500 TONST RAILS —60 lbs. to the yard. Depth of rail, 3½ inches; width of base 4 inches; width of top, 2½ inches; length of bars 15 and 17½ feet. Apply to,

A Steam Pile Driver—built by "Dunham & Co." —in complete order; has never been used, and for sale a bargain. Cost originally $5,000. Also 12 Railway Passenger Cars, that have never been used, which will be sold a bargain. 8

DAVIS BROOKS & CO.,
April 11. 39 Wall street

TO LOCOMOTIVE AND MARINE ENgine Boiler Builders. Pascal Iron Works, Philadelphia. Welded Wrought Iron Flues, suitable for Locomotives, Marine and other Steam Engine Boilers, from 2 to 5 inches in diameter. Also, Pipes for Gas, Steam and other purposes; extra strong Tube for Hydraulic Presses; Hollow Pistons for Pumps of Steam Engines, etc. Manufactured and for sale by

MORRIS TASKER & MORRIS,

Warehouse S. E. corner 3d and Walnut Sts., Philadelphia 1t

LAWRENCE'S ROSENDALE HYDRAulic Cement. This cement is warranted equal to any manufactured in this country, and has been pronounced superior to Francis' "Roman." Its value for Aqueducts, Locks, Bridges, Flooms and all Masonry exposed to dampness, is well known, as it sets immediately under water, and increases in solidity for years.

For sale in lots to suit purchasers, in tight papered barrels, by JOHN W. LAWRENCE,
142 Front street, New York.

☞ Orders for the above will be received and promptly attended to at this office. 32 1y

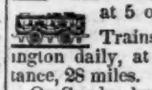
A. & G. RALSTON & CO., NO. 4 South Front St., Philadelphia, Pa.

Have now on hand, for sale, Railroad Iron, viz:
180 tons 2½ x ½ inch Flat Punched Rails, 20 ft. long.
25 " 2½ x ½ " Flange Iron Rails.
75 " 1 x ½ " Flat Punched Bars for Drafts in Mines. A full assortment of Railroad Spikes, Boat and Ship Spikes. They are prepared to execute orders for every description of Railroad Iron and Fixtures. 1tf

SPRING STEEL FOR LOCOMOTIVES, Tenders and Cars. The Subscriber is engaged in manufacturing Spring Steel from 1½ to 6 inches in width, and of any thickness required: large quantities are yearly furnished for railroad purposes, and wherever used, its quality has been approved of. The establishment being large, can execute orders with great promptitude, at reasonable prices, and the quality warranted. Address

JOAN F. WINSLOW, *Agent*,
Albany Iron and Nail Works,

LEXINGTON AND OHIO RAILROAD. Trains leave Lexington for Frankfort daily, at 5 o'clock a.m., and 2 p.m.



Trains leave Frankfort for Lexington daily, at 8 o'clock a.m. and 2 p.m. Distance, 28 miles. Fare $1·25.

On Sunday but one train, 5 o'clock a.m. from Lexington, and 2 o'clock p.m. from Frankfort.

The winter arrangement (after 15th September to 15th March) is 6 o'clock a.m. from Lexington, and ma. 9. from Frankfort, other hours as above.
351y

BOSTON AND ALBANY.—WESTERN RAILROAD.—Fare Reduced.

1846..Spring Arrangement..1846

Commencing April 1st.

Passenger trains leave daily, Sundays excepted—

Boston	7½ p. m.	and 4 p. m.	for Albany.
Albany	6½ "	and 2½ "	for Boston.
Springfield	7 "	and 1 "	for Albany.
Springfield	7 "	and 1½ "	for Boston.

Boston, Albany and Troy:

Leave Boston at 7½ a. m., arrive at Springfield at 12 m., dine, leave at 1 p. m., and reach Albany at 6½ p. m.

Leave Boston at 4 p. m., arrive at Springfield at 8 p. m., lodge, leave next morning at 7, and arrive at Albany at 12½ m.

Leave Albany at 6½ a. m., arrive at Springfield at ½ m., dine, leave at 1½ p. m., and arrive at Boston 6½ p. m.

Leave Albany at 2½ p. m., arrive at Springfield at 8½ p. m., lodge, leave next morning at 7, and arrive at Boston at 12 m.

The trains of the Troy and Greenbush railroad connect with all the above trains at Greenbush.

Fare from Boston to Albany, $5; fare from Springfield to Boston or Albany, $2 75.

Boston and New York, via Springfield: Passengers leaving Boston at 4 p. m., arrive in Springfield at 8 p. m., proceed directly to Hartford and New Haven, and thence by steamers to New York, arriving at 5 o'clock a. m.

For Buffalo: the trains for Buffalo leave Albany at 7½ a. m. and 7 p. m., arriving at Buffalo at 8 a. m. and 8 p. m. next day. Returning, arrive at Albany at 4 a. m. and 4 p. m.

New York and Boston, via Albany: the trains from Boston arrive at Albany in season for the 7 o'clock boats to New York. Returning, the boats, leaving New York at 5 and 7 p. m., reach Albany at 5 a. m., in ample season for the morning trains to Boston.—Steamboats also leave Albany at 7 a. m. and 5 p. m. and stop at the usual landing landing plrces upon the river.

The trains of the Springfield, Hartford and New Haven railroad, connect at Springfield, and passengers from Albany or Boston proceed directly on to Hartford and New Haven.

Montreal: through tickets to Montreal may be obtained in Boston, by which passengers may proceed to Troy, and thence by stage via Chester, Elizabeth, etc., and in the season of navigation by canal to Whitehall, and thence by the splendid steamers of Lake Champlain to St. John, via Burlington, and thence by railroad and steamers to Montreal.

The trains of the Hudson and Berkshire railroad connect at Chatham and State Line.

The Housatonic railroad connects at State Line.

The trains of the Connecticut River railroad connect at Springfield, and passengers may proceed without delay to Northampton, and thence by stage to Greenfield, Brattleboro, Bellows Falls, Hanover, Haverhill, etc.

Stages leave West Brookfield for Ware, Endfield, New Baintree and Hardwick; also leave Palmer, for Three Rivers, Belchertown, Amherst, Ware and Monson; Pittsfield for North and South Adams, Williamstown, Lebanon Springs, etc.

Merchandize trains run daily (Sundays excepted) between Boston, Albany, Troy, Hudson, Northampton, Hartford, etc.

For further information apply to C. A. Read, agent, 27 State street, Boston, or to S. Witt, agent, Albany.

JAMES BARNES,
Superintent and Engineer.

Western Railroad Office,
Springfield, April 1, 1846. } 14 1y

MANUFACTURE OF PATENT WIRE Rope and Cables for Inclined Planes, Standing Ship Rigging, Mines, Cranes, Tillers etc., by

JOHN A. ROEBLING, *Civil Engineer*,
Pittsburgh, Pa.

These Ropes are in successful operation on the planes of the Portage Railroad in Pennsylvania, on the Public Slips, on Ferries and in Mines. The first rope put upon Plane No. 3, Portage Railrord, has now run 4 seasons, and is still in good condition. 2v19 1y

BACK VOLUMES OF THE RAILROAD JOURNAL for sale at the office, No. 23 Chambers street.

RAILROAD IRON.—The subscriber having taken contrats for all the Railroad Iron he can manufacture at his Iron Works at Trenton, until July next, will gladly receive orders for any quantity to be delivered after that time, not exceeding thirty tons per day. Also has on hand and will make to order Bar Iron, Braziers' Rods, Wire Rods and Iron Wires of all sizes, warranted of the best quality. Also manufactures and has on hand Refined American Isinglass, warranted equal in strength to the Russian. Also on hand a constant supply of Glue, Neats' Oil, &c. &c.

PETER COOPER, 17 Burling Slip.
New York, January 23d, 1846. 1y 10

C. J. F. BINNEY,

GENERAL COMMISSION MERCHANT and Agent for Coal, and also Iron Manufactures, etc.

No. 1 City Wharf, Boston.
Advances made on Consignments.
Refer to Amos Binney, *Boston.*
Grant & Stone, } *Philadelphia.*
Brown, Earl & Erringer, }
Weld & Seaver, *Baltimore.*
December 8, 1845. 1m 50

SCRIBNER'S ENGINEERS' AND MECHANICS' COMPANION. For sale at this office. Price $1·50.

LARD OIL FOR MACHINERY, ETC.—Winter pressed, cleansed from gum, and manufactured expressly for engines and machinery of all kinds, railroads, steamboats, woollen and other manufactures, and for burning in any lamp without clogging the wick. Engineers of railroads and others who have used this oil, and to whom reference can be made, give it preference over the best sperm for its durability, and not requiring to be cleaned off like that, and costing about two-thirds the price. For sale by the barrel, and samples can be sent for trial, by addressing C. J. F. BINNEY,
Agent for the Manufacturer,
11 eop 1m Boston, Mass.

ENGINEERS' AND SURVEYERS'
INSTRUMENTS MADE BY
EDMUND DRAPER,
Surviving partner of
STANCLIFFE & DRAPER.

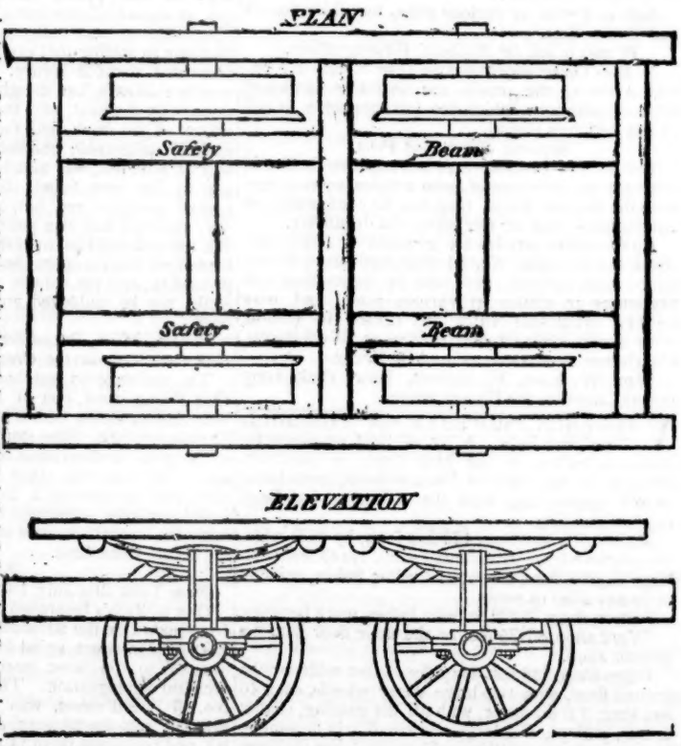
No 23 Pear street, near Third, below Walnut, Philadelphia.

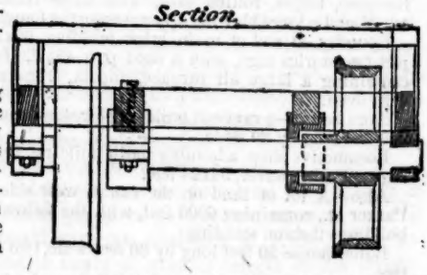
KITE'S PATENT SAFETY BEAM.

MESSRS. EDITORS.—As your Journal is devoted to the benefit of the public in general I feel desirous to communicate to you for publication the following circumstance of no inconsiderable importance, which occurred some few days since on the Philadelphia, Wilmington and Baltimore railroad.

On the passage of the evening train of cars from Philadelphia to this city, an axle of our large 8 wheeled passenger car was broken, but from the particular plan of the construction, the accident was entirely unknown to any of the passengers, or, in fact, to the conductor himself, until the train, (as was supposed from some circumstances attending the case,) had passed several miles in advance of the place where the accident occurred, whereas had the car been constructed on the common plan the same kind of accident would unavoidably have much injured it, perhaps thrown the whole train off the track, and seriously injured, if not killed many of the passengers.

Wilmington, Del., Sept. 28, 1840.





☞ The undersigned takes pleasure in attesting to the value of Mr. Joseph S. Kite's invention of the Safety Beam Axle and Hub for railroad cars. They have for some time been applied to passenger cars on this road, and experience has tested that they fully accomplish the object intended. Several instances of the fracture of axles have occurred, and in such the cars have uniformly run the whole distance with entire safety. Had not this invention been used, serious accidents must have occurred.

In short, we consider Mr. Kite's invention as completely successful in securing the safety of property and lives in railroad travelling, and should be used on all railroads in the country.

JOHN FRAZER, Agent, JAMES ELLIOTT, Sup. Motive Power,
GEORGE CRAIG, Superintendant, W. L. ASHMEAD, Agent.

☞ A model of the above improvement is to be seen at the New Jersey railroad and transportation office, No. 1 Hanover st., N. York. ja45

PATENT HAMMERED RAILROAD, SHIP and Boat Spikes. The Albany Iron and Nail Works have always on hand, of their own manufacture, a large assortment of Railroad, Ship and Boat Spikes, from 2 to 12 inches in length, and of any form of head. From the excellence of the material always used in their manufacture, and their very general use for railroads and other purposes in this country, the manufacturers have no hesitation in warranting them fully equal to the best spikes in market, both as to quality and appearance. All orders addressed to the subscriber at the works, will be promptly executed. JOHN F. WINSLOW, *Agent.*

Albany Iron and Nail Works, Troy, N. Y.

The above spikes may be had at factory prices, of Erastus Corning & Co., Albany; Hart & Merritt, New York; J. H. Whitney, do.; E. J. Etting, Philadelphia; Wm. E. Coffin & Co, Boston. ja45

PATENT RAILROAD, SHIP AND BOAT Spikes. The Troy Iron and Nail Factory keeps constantly for sale a very extensive assortment of Wrought Spikes and Nails, from 3 to 10 inches, manufactured by the subscriber's Patent Machinery, which after five years' successful operation, and now almost universal use in the United States (as well as England, where the subscriber obtained a patent) are found superior to any ever offered in market.

Railroad companies may be supplied with Spikes having countersink heads suitable to holes in iron rails, to any amount and on short notice. Almost all the railroads now in progress in the United States are fastened with Spikes made at the above named factory—for which purpose they are found invaluable, as their adhesion is more than double any common spikes made by the hammer.

All orders directed to the Agent, Troy, N. York, will be punctually attended to.

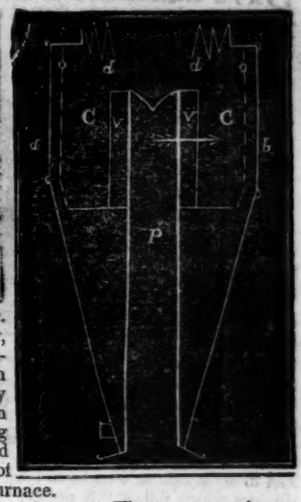
HENRY BURDEN, *Agent.*

Spikes are kept for sale, at Factory Prices, by I. & J. Townsend, Albany, and the principal Iron merchants in Albany and Troy; J. I. Brower, 222 Water St., New York; A. M. Jones, Philadelphia; T. Janviers, Baltimore; Degrand & Smith, Boston.

*** Railroad Companies would do well to forward their orders as early as practicable, as the subscriber is desirous of extending the manufcturing so as to keep pace with the daily increasing demand.

ja15

FRENCH AND BAIRD'S PATENT SPARK ARRESTER.



TO THOSE INTERESTED IN Railroads, Railroad Directors and Managers are respectfully invited to examine an improved SPARK ARRESTER, recently patented by the undersigned.

Our improved Spark Arresters have been extensively used during the last year on both passenger and freight engines, and have been brought to such a state of perfection that no annoyance from sparks or dust from the chimney of engines on which they are used is experienced.

These Arresters are constructed on an entirely different principle from any heretofore offered to the public. The form is such that a rotary motion is imparted to the heated air, smoke and sparks passing through the chimney, and by the centrifugal force thus acquired by the sparks and dust they are separated from the smoke and steam, and thrown into an outer chamber of the chimney through openings near its top, from whence they fall by their own gravity to the bottom of this chamber; the smoke and steam passing off at the top of the chimney, through a capacious and unobstructed passage, thus arresting the sparks without impairing the power of the engine by diminishing the draught or activity of the fire in the furnace.

These chimneys and arresters are simple, durable and neat in appearance. They are now in use on the following roads, to the managers and other officers of which we are at liberty to refer those who may desire to purchase or obtain further information in regard to their merits:

E. A. Stevens, President Camden and Amboy Railroad Company; Richard Peters, Superintendant Georgia Railroad, Augusta, Ga.; G. A. Nicolls, Superintendant Philadelphia, Reading and Pottsville Railroad, Reading, Pa.; W. E. Morris, President Philadelphia, Germantown and Norristown Railroad Company, Philadelphia; E. B. Dudley, President W. and R. Railroad Company, Wilmington, N. C.; Col. James Gadsden, President S. C. and C. Railroad Company, Charleston, S. C.; W. C. Walker, Agent Vicksburgh and Jackson Railroad, Vicksburgh, Miss.; R. S. Van Rensselaer, Engineer and Sup't Hartford and New Haven Railroad; W. R. M'Kee, Sup't Lexington and Ohio Railroad, Lexington, Ky.; T. L. Smith, Sup't New Jersey Railroad Trans. Co.; J. Elliott, Sup't Motive Power Philadelphia and Wilmington Railroad, Wilmington, Del.; J. O. Sterns, Sup't Elizabethtown and Somerville Railroad; R. R. Cuyler, President Central Railroad Company, Savannah, Ga.; J. D. Gray, Sup't Macon Railroad, Macon, Ga.; J. H. Cleveland, Sup't Southern Railroad, Monroe, Mich.; M. F. Chittenden, Sup't M. P. Central Railroad, Detroit, Mich; G. B. Fisk, President Long Island Railroad, Brooklyn.

Orders for these Chimneys and Arresters, addressed to the subscribers, care Messrs. Baldwin & Whitney, of this city or to Hinckly & Drury, Boston, will be promptly executed. FRENCH & BAIRD.

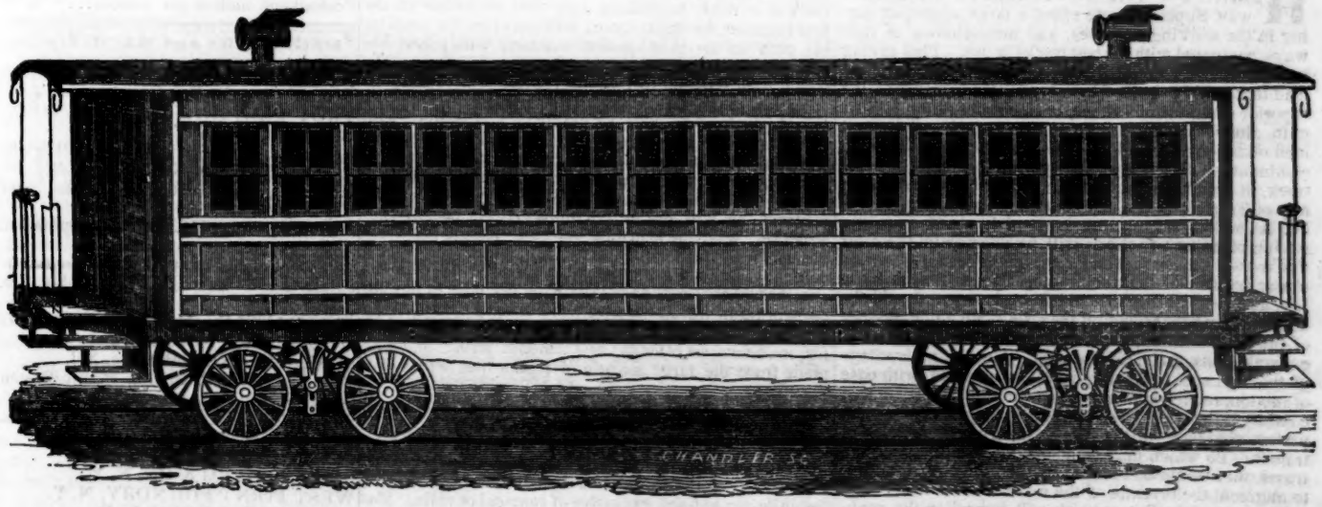
N. B.—The subscribers will dispose of single rights, or rights for one or more States, on reasonable terms. *Philadelphia, Pa., April* 6, 1844.

*** The letters in the figures refer to the article given in the *Journal* of June, 1844. ja45

BENTLEY'S PATENT TUBULAR STEAM BOILER. The above named Boiler is similar in principle to the Locomotive boilers in use on our Railroads. This particular method was invented by Charles W. Bentley, of Baltimore, Md., who has obtained a patent for the same from the Patent Office of the United States, under date of September 1st, 1843—and they are now already in successful operation in several of our larger Hotels and Public Institutions, Colleges, Alms Houses, Hospitals and Prisons, for cooking, washing, etc.; for Bath houses, Hatters, Silk, Cotton and Woollen Dyers, Morocco dressers, Soap boilers, Tallow chandlers, Pork butchers, Glue makers, Sugar refiners, Farmers, Distillers, Cotton and Woollen mills, Warming Buildings, and for Propelling Power, etc., etc.; and thus far have given the most entire satisfaction, may be had of D. K. MINOR, 23 Chambers st. New York.

a

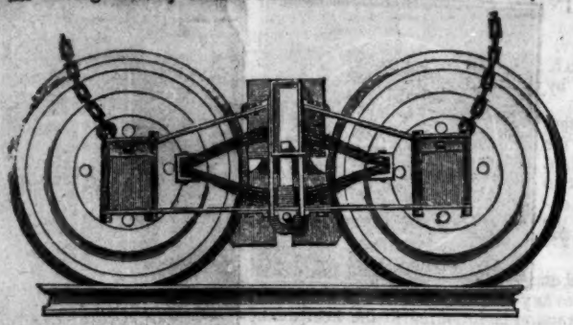
DAVENPORT & BRIDGES' CAR WORKS.



DAVENPORT & BRIDGES CONTINUE TO MANUFACTURE TO ORDER, AT THEIR WORKS, IN CAMBRIDGEPORT, MASS. Passenger and Freight Cars of every description, and of the most improved pattern. They also furnish Snow Ploughs and Chilled Wheels of any pattern and size. Forged Axles, Springs, Boxes and Bolts for Cars at the lowest prices. All orders punctually executed and forwarded to any part of the country

Our Works are within fifteen minutes ride from State street, Boston—coaches pass every fifteen minues.

RAY'S EQUALIZING RAILWAY TRUCK.—THE SUBSCRIBER having recently formed a business connection in the City of New



York, expressly for the manufacture of the newly patented and highly approved Railroad Truck of Mr. Fowler M. Ray, is ready to receive orders for building the same, from Railroad Companies and Car Builders in the United States, and elsewhere.

The above Truck has now been in use from one to two years on several roads a sufficient length of time to test its durability, and other good qualities, and to satisfy those who have used it, as may be seen by reference to the certificates which follow this notice.

There have been several improvements lately introduced upon the Truck, such as additional springs in the bolster of passenger cars, making them delightful riding cars—adapting it to tenders, trucks forward of the locomotive, and freight cars, which, with its original good qualities, make it in all respects the most desirable truck now offered to the public.

Orders for the above, will, for the present, be executed at the New York Screw Mill, corner 33d street and 3d avenue, (late P. Cooper's rolling mills) and at the Steam Engine Shop of T. F. Secor & Co., foot of 9th street, East river, (of which firm the subscriber was late a partner) under the immediate supervision of Mr. Ray himself.

Several sets of trucks containing the latest improvements have recently been turned out for the New York and Erie railroad, and the New Jersey Transportation company, which may be seen upon said roads.

The patronage of Railroad Companies and Car Builders is respectfully solicited.

New York, May 4, 1846. W. H. CALKINS, and Others.

To all whom it may concern:—This is to certify that the New Haven, Hartford and Springfield railroad co., have had in use six sets of F. M. Ray's patent trucks for the last 20 months, during which time it appears to me, they have proved to be the bes and most economical truck now in use.

[Signed,] WILLIAM ROE, Sup't of Power.

I certify that F. M. Ray's Patent Equalizing Railroad Truck has been in use on the Philadelphia and Reading railroad for some time past, under a passenger car.

For simplicity of construction, economy in cost, lightness of material, and extreme ease of motion, I consider it the best truck we have ever used. Its peculiar make also renders it less liable to be thrown off the track, when passing over any obstruction. We intend using it extensively under the passenger and freight cars of the above road.

Reading, Pa., October 6, 1845. [Signed,] G. A. NICOLL, Sup,t Transportation, etc., Philadelphia and Reading Railroad.

To all whom it may concern:—This is to certify that the N. Jersey Railroad and Transportation company have used Fowler M. Ray's Truck for the last seven months, during which time it has operated to our entire satisfaction. I have no hesitation in saying that it is the simplest and most economical truck now in use. [Signed,] T. L. SMITH,

Jersey City, November 4, 1845. N. Jersey Railroad and Transp. Co.

This is to certify that F. M. Ray's Patent Equalizing Railroad Truck has been in use on the Long Island railroad for the last year, under a freight car.

For simplicity of construction, economy in cost, lightness of material and ease of motion, I consider it equal to any truck we have in use.

Long Island Railroad Depot, Jamaica November 12, 1845. [Signed,] JOHN LEACH, Sup't Motive Power.

HERRON'S PATENT AMERICAN RAILWAY TRACK,

As seen stripped of the top ballasting

HERRON'S IMPROVEMENTS IN RAILway Superstructure effect a large aggregate saving in the working expenses, and maintenance of railways, compared with the best tracks in use. This saving is effected—1st, Directly by the amount of the increased load that will be hauled by a locomotive, owing to the superior evenness of surface, of line and of joint. This gain alone may amount to 20 per cent. on the usual load of an engine.—2d, In consequence of the thorough combination, bracing, and large bearing surface of this track, it will be maintained in a better condition than any other track in use, at about one-third the expense.—3d, As action and reaction are equal, a corresponding saving of about two-thirds will be effected in the *wear* and *tear* of the *engines* and *cars*, by the *even surface* and *elastic structure* of the track.—4th, The great security to life, and less liability to accident or damage, should the engine or cars be thrown off the rails.—5th, The absence of jar and vibration, that shake down retaining walls, embankments and bridges.—6th, The great advantage of the high speed that may be safely attained, with ease of motion, reduction of noise, and consequently increased comfort to the traveller.—7th, The really *permanent* and perfect character of the Way, insuring regularity of transit. To which may be added the great increase of travel, that would be induced by the foregoing qualities to augment the revenue of the railroad.

The cost of the Patent track will depend on the quantity and cost of iron and other materials; but it will not exceed, even including the preservation of the timber, the average cost of the tracks on our principal railroads. Generally, the timber structure, fastenings and workmanship, exclusive of the cost of the iron rails, will be from $2,300 to $4,000 per mile. On this structure, rails of from 40 to 50 lbs. per yard, will be equal in effect to 60 and 70 lbs. rails laid in the usual way. The proprietors of a road, furnishing approved materials in the first instance, the undersigned will construct the track on his plan in the most perfect manner, with recent improvements, for one thonsand dollars per mile. And he will farther contract to maintain said track for the period of ten years, furnishing such preserved timber and iron fastenings as may be required, and keeping said track in *perfect adjustment*, under any trade not exceeding 100,000 tons per annum, or its equivalent in passenger transportrtion, for *Two hundred dollars per mile per annum.** To insure the faithful performance of this contract, he will pledge one-fourth of the cost of construction, with the accruing interest thereon, regularly vested, until the completion of the contract. So that a company, by securing payment to the undersigned at the specified period, will have only $750 per mile to pay for the workmanship on the track, without any charge being made for the use of the patent, the subsequent payments, for maintenance of way, and amount withheld, being made from the large margin of profits that will result from its use.

JAMES HERRON.
Civil Engineer and Patentee.
No. 277 *South Tenth St., Philadelphia.*

* A general average of the repairs done on six of the most successful railroads in this country, for a period of from six to eight years' use has been found to exceed $625 per mile per annum, exclusive of renewal of rails. But few roads in this country carry as much as 100,000 tons per annum. When a road exceeds that quantity, the repairs due to the additional tonnage, up to 200,000 tons, will be charged at one mill per ton; over the latter, and not exceeding 300,000 tons, nine-tenths of a mill, etc. Where there are two tracks to maintain, a large reduction upon those rates will be made. 1y1

THE AMERICAN RAILROAD JOURNAL is the only periodical having a general circulation throughout the Union, in which all matters connected with public works can be brought to the notice of all persons in any way interested in these undertakings. Hence it offers peculiar advantages for advertising times of departure, rates of fare and freight, improvements in machinery, materials, as iron, timber, stone, cement, etc. It is also the best medium for advertising contracts, and placing the merits of new undertakings fairly before the public.

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ROGERS, KETCHUM AND GROSVENOR, Patterson, N. J. (*See Adv.*)
S. VAIL, Speedwell Iron Works, near Morristown, N. J. (*See Adv.*)
NORRIS, BROTHERS, Philadelphia Pa. (*See adv.*)
KITE'S Patent Safety Beam. (*See Adv.*)
FRENCH & BAIRD, Philadelphia, Pa. (*See Adv.*)
NEWCASTLE MANUFACTURING COMPANY, Newcastle, Del. (*See Adv.*)
ROSS WINANS, Baltimore, Md.
CYRUS ALGER & Co., South Boston Iron Company.
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